MapInfo Professional

Version 9.0

USER GUIDE (ABRIDGED)

MapInfo
Be Location Intelligent™

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1

Introduction

Welcome to the MapInfo family of products! As the field of computer mapping continues to expand, MapInfo leads the way with new products that are designed to fulfill users' computer mapping needs from the most basic to the most specialized with MapMarker, our premier address matching product.

MapInfo Professional®, our flagship product, is a comprehensive computer mapping tool that enables you to perform complex geographic analysis such as redistricting, accessing your remote data, dragging and dropping map objects into your applications, creating thematic maps that emphasize patterns in your data, and much more.

This User Guide contains all of the information you need to learn about and be productive using MapInfo Professional.

Sections in this Chapter:

- What is MapInfo Professional? 16
- Getting Support 19

What is MapInfo Professional?

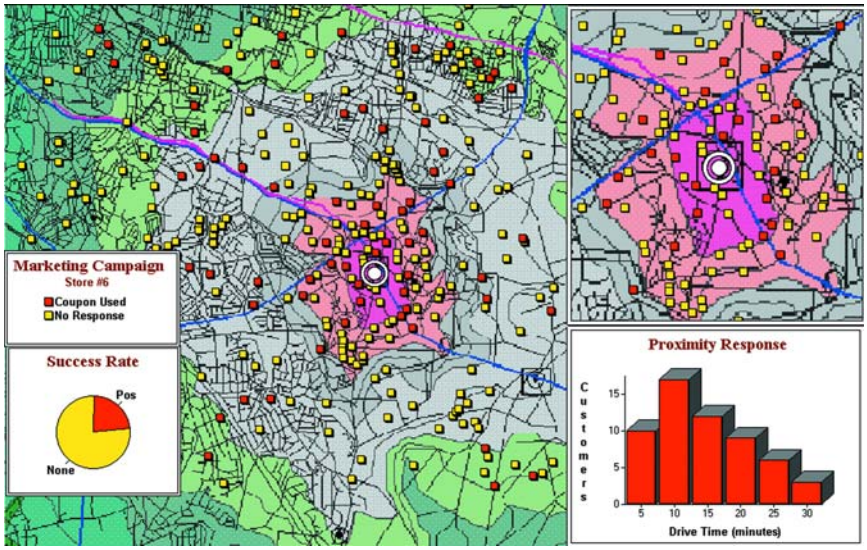
With MapInfo Professional, the power of computer mapping is at your complete disposal. You can display your data as points, as thematically shaded regions, as pie or bar charts, as districts, etc. You can perform geographic operations such as redistricting, combining and splitting objects, and buffering. You can also make queries against your data and access your remote data directly from MapInfo Professional.

For example, MapInfo Professional can show which branch store is the closest to your biggest customers. It can calculate the distances between customers and stores; it can show you the customers who spent the most last year; it can color-code the store symbols by sales volume. What makes it all come together is a visual display of your data on the map.

Mapping at a Glance

Huge quantities of information are available today, far more than ever before. Data abounds in spreadsheets, sales records, and marketing files. Paper and disk store masses of information on customers, stores, personnel, equipment, and resources. Thematic maps and graphs show distribution of customers for a marketing campaign.

Figure: Thematic Map Example



Nearly all of it has a geographic component. An estimated 85 percent of all databases contain some sort of geographic information such as street addresses, cities, states, postal codes, or even telephone numbers with area codes and exchange numbers.

Computer mapping can help you sort through all of this information, and using the geographic components in your data, display your results on a map. This lets you see patterns and relationships in the mass of information quickly and easily without having to pore over your database.

Windows Compatibility

MapInfo Professional is Windows XP Professional and Windows XP Home and Office compatible, so you will feel right at home with its windowing environment. It is designed to fit smoothly into your work environment, so it only changes the results you get, not the way you work.

Using Your Own Data

To begin with, you can use the data you already have, in the form it's already in — spreadsheets such as Excel, databases such as Access 2000, popular CAD packages, and other GIS applications, to name just a few. If your data is on a remote database, you can access it directly from MapInfo Professional. If you have data that is not already online, you can create database files right inside the product, or use data supplied by MapInfo — such as census data.

Similarly, you can use any of thousands of maps available from MapInfo, everything from street and highway maps to world maps. You can also create your own maps, either in MapInfo Professional or with a drawing package. You can diagram anything — floor plans, flow charts, even brain anatomy — can be treated as a map and entered into the product.

After you've organized your data visually, you'll save the results to files, or send them to any of the dozens of printers and plotters MapInfo Professional recognizes.

If you have your data on hand and you can read a map, you're just about ready to begin. Soon, we'll show you an example of how easy it is to put MapInfo Professional's power to work for you.

But first, install MapInfo Professional following the instructions in **Installing MapInfo Professional in Chapter 3 on page 85**. If you are new to the product, or new to computer mapping, we suggest you refer to **The Basics of MapInfo Professional in Chapter 4 on page 153** for an overview of basic mapping terms and concepts. Use the web-enabled tutorial to learn about its features, and become accustomed to the more common tasks and functions.

For more product and service information, you can connect directly from MapInfo Professional to our forum (on the **Help** menu, click **MapInfo on the Web**), or, consult our World Wide Web site (**http://www.mapinfo.com**).

Reviewing the MapInfo Professional Features

MapInfo Professional gives you the processing power of databases (including powerful SQL queries) and the visual power of maps, plus charts and graphs. It's an essential business tool for data analysis, sales, and presentations.

Here is a look at some of the features MapInfo Professional offers:

- Direct opening of files created with dBASE or FoxBASE, delimited ASCII, comma delimited CSV files, ESRI® shapefiles, Lotus 1–2–3, Microsoft Excel, and Microsoft Access; importing of graphics files in a variety of formats; a function for creating database files from within the product.
- Multiple views of your data in Map, Browser, and Graph windows. Hot Views allow you to open multiple views of the same data and update them when you change any one view.
- Live ODBC access to remote database data such as Oracle and SQL Server.
- Seamless map layers that allow you to handle several map layers as if they were one layer.
- Cartographic legends, enabling you to create and customize legends for any map layer.

- Thematic maps to create analyses of your data with high visual impact, including grid surface themes, 3DMaps, and Prism maps.
- Use raster underlay capabilities to enhance your work session.
- Querying capabilities ranging from simple data selections from a single file to complex SQL queries from one or more files.
- Workspaces that save all your settings and views so you can start where you left off.
- HotLinks that let you launch files or URLs directly from a Map window.
- OLE embedding of Map windows into other applications.
- A comprehensive array of drawing and editing tools for customizing your maps.
- Thousands of ready-made maps and functions for creating your own maps.
- Crystal Reports, the industry-standard report-writing program, allows you to create reports of your tabular data directly in the product.
- A layout window for preparing output.
- Printing and export capabilities for high-quality output
- The ability to change the projection of your map for display or digitizing.
- Object processing functions that help to correct errors in data, set node snap tolerances for different objects, as well as thin nodes and polygons.

When it's time to run MapInfo Professional, you'll feel right at home with its windowing environment. After you've organized your data visually, you'll save the results to files, or send them to your printer or plotter.

For tips to help you succeed in using MapInfo Professional, see *Ensuring Your Success* in the Help System.

MapInfo Professional Documentation Set

We have updated our MapInfo Professional *User Guide (Abridged)* to include the new features of MapInfo Professional and integrated issues and features from earlier versions. If you cannot find information you are looking for, please refer to the online help system, which is installed with the product.

Accessing MapInfo Professional Documentation

You can access the MapInfo Professional and Crystal Reports PDF files in the Documentation subfolder located in your installation directory. You can read these files using Adobe® Acrobat Reader, which is available on the installation CD or by going to the Adobe web site:

.**http://www.adobe.com/products/acrobat/readstep2.html**

Getting Support

Here at MapInfo Corporation, we are committed to your success and we provide a wide range of support to assist you in getting the results you are working toward.

Using the Status Bar

The Status Bar along the lower edge of your window provides helpful information during your mapping session and allows you to make some changes directly in the Status Bar. On the **Options** menu, click **Show/Hide Status Bar** to control the display of the Status Bar.

Note: Not all entries display in the Status Bar at all times. Entries display when a feature is active.

- *Status Bar Help*: For instantaneous answers to "What does that command do" simply move the cursor over the command. A brief description of the command displays in the left pane of the Status Bar along the lower edge of your screen.
- *Zoom, Map Scale, Cursor Location*: View any one of these settings in the Status Bar. You can change which one displays directly from the Status Bar. Click the arrow on the right side of the box to display a popup list of the three options. Click the setting you want to display. The Status Bar automatically updates. These display settings are also controlled in the Map Options dialog box (on the **Map** menu, click **Options**).
- *Editable Layers*: To keep track of which layer is currently editable, review the list of layers that display in the Status Bar. You can change the editable layer directly in the Status Bar. Click the arrow to the right of the box to display a popup list of the layers in the Map window. Click the layer you want to make editable. The Status Bar automatically updates, showing the new editable layer.
- *Selectable Layers*: The Status Bar indicates which layer the current selection is from. If there is nothing selected, the Status Bar reads: "Selecting: NONE."
- *Browser window Records*: When viewing a table in a Browser, the record count displays in the Status Bar.
- *Snap-to-Node*: This **S**-key toggle feature is in use when SNAP displays in the Status Bar.
- *Autotrace indicator*: This **T**-key feature is in use when AUTOTRACE displays in the Status Bar.
- *Autonode indicator*: This **N**-key feature is in use when AUTONODE displays in the Status Bar.

Using the Help System

MapInfo Professional's comprehensive Online Help system provides the information you need to learn and use the product more effectively. You can reach the information in several ways:

- Use the Help Contents screen to choose topics from "books". Click a book to display its topics, choose a topic from the list.
- Use the Search feature to search on a specific word. Type the word you want to search for in the first field, select the matching word in the second, and then the topic in the third box. MapInfo Professional displays the topic in the pane on the right.
- Use the Index feature to find a topic quickly. Type the first few letters of the word you are looking for. The index entry that most closely matches your entry is highlighted. Click the index entry you want to display.
- Use the **Favorites** tab to collect and store topics you want to refer to frequently.

- Context-Sensitive Feature: Press the **F1** key to receive more information on any menu command or dialog box. The Help window for that item displays. Also click the **Help** button in the MapInfo Professional dialogs to display information on the current dialog box.
- Quick Access to the MapInfo publications web site: Click the underlined MapInfo Corporation name at the bottom of each topic page to go to the MapInfo web site. From here you have access to product information, upcoming events, tech tips, and a complete set of documentation.

Getting Technical Support

MapInfo Corporation offers a free support period on all new software purchases and upgrades, so you can be productive from the start. Once the free period ends, MapInfo Corporation offers a broad selection of extended support services for individual, business, and corporate users.

Technical Support is here to help you, and your call is important. This section lists the information you need to provide when you call your local support center. It also explains some of the technical support procedures so that you will know what to expect about the handling and resolution of your particular issue.

Please remember to include your serial number, partner number or contract number when contacting Technical Support.

Technical Support Offerings

To use Technical Support, you must register your product. This can be done very easily during installation or anytime during normal business hours by contacting Customer Service directly at 1-800-552-2511 Option 3.

Full technical support for MapInfo Professional is provided for the currently shipping version plus the two previous versions.

Extended support options are available at each of our technical support centers in the Americas, Europe/Middle East/Africa, and Asia-Pacific regions. See below for how to contact the office nearest you.

- For technical support contact information for your geography, see the *Getting Technical Support* topic in the *Help System*.

2

What's New in MapInfo Professional 9.0

Thank you for upgrading to the most advanced computer mapping product in the MapInfo family! As the field of computer mapping continues to expand, MapInfo leads the way with new products that are designed to fulfill your computer mapping needs from the most basic to the most specialized with MapMarker, our premier address matching product and Envinsa, our enterprise-wide location platform.

For more information about the bug fixes and corrections we have made to MapInfo Professional in this release, you will soon be able to review the release notes at:

http://extranet.mapinfo.com/support/documentation/manuals.cfm

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Before You Get Started

There are some big enhancements to the MapInfo Professional 9.0 functionality including support for curved labels, new time and date/time data types for crime analysis and other queries and thematic maps, and being able to open new data formats directly in the application.

All of the data used in this documentation is available either from the data CD or from the trial data on the MapInfo web site. To retrieve the trial data, go to:

www.mapinfo.com > Support and Training > Downloads > MapInfo Professional > MIProTrialData.exe

and download this data to your computer. You must have Internet access to retrieve the trial data.

Changes to the Installer

In the past, if you wanted to add ODBC or Oracle Spatial support, you followed the Custom Workstation Installation instructions. We have changed the installation program to add the ODBC Connectivity and Oracle Spatial support by default. This should simplify the installation process and ensure a better product installation experience.

You may notice that we have shipped two disks for MapInfo Professional this time. One is your familiar MapInfo Professional installation CD and the other is a data CD that contains new and updated data you can use to improve the accuracy of geocoding and enhance the look of your maps. For more information about this change see **Data Enhancements on page 76**.

Licensing Support for MapInfo Professional

We have added product licensing options to the MapInfo Professional product during this release. Please review the licensing documentation carefully in **Installing and Configuring MapInfo Professional on page 79**.

MapBasic Available Free of Charge on the Web

MapInfo has decided to make MapBasic, the powerful API you can use to extend MapInfo Professional available on the web. Go to **www.mapinfo.com/proresources** to obtain your free copy of MapBasic 9.0 and access other resources to enhance your use of MapInfo Professional.

Major Features and Enhancements

We have created the following major features and enhancements in response to your requests and suggestions.

- **Using Date- and Time-Based Data in Maps and Queries on page 23**
- **Curved Labels Improve the Look of Your Maps on page 31**
- **Using Universal Data Directly on page 34**
- **Using Templates for Layouts on page 40**

Using Date- and Time-Based Data in Maps and Queries

If you maintain time- or date/time-specific data, you may be interested in querying that information and displaying it visually in your MapInfo maps. We have added new Time and DateTime data types to allow you to display that data thematically and as part of a query analysis. You could use this new data type for many types of projects, such as to display crime information based on Date and Time or to post schedules based on resource availability on a particular date. Additionally if you use Access, Excel, dBase, and remote databases and you have not been able to use the date and time based information in the past, we are providing a way for you to use that information in MapInfo Professional. In the past, when you converted this type of information into a MapInfo format, the information either was interpreted incorrectly, it was truncated, or it did not translate at all.

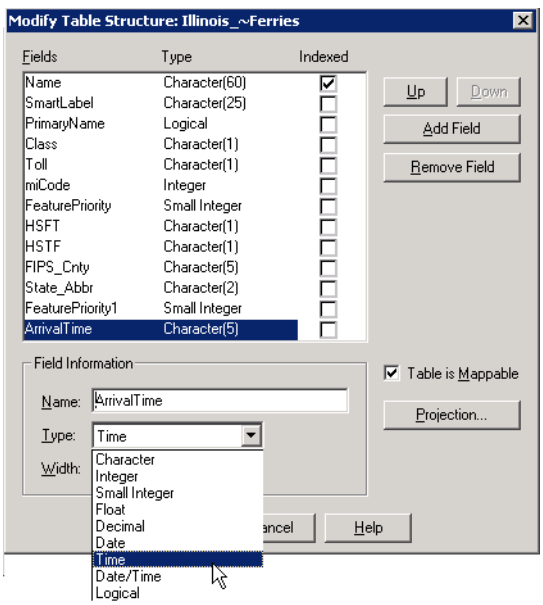
These new data types have been added in many places throughout MapInfo Professional and show up in the lists of your Query dialog boxes. However what is most important is that you understand how this data is now interpreted when bringing it into MapInfo format.

Using the New Data Types

You can convert existing fields with time or time/date information into the new format so you can use them for querying and thematic maps.

To convert your data:

1. Open the data you want to convert in MapInfo Professional.
2. Chose **Table > Maintenance > Table Structure** and select the table for which you want to change the data type. The Modify Table Structure dialog box displays.



3. To change the **ArrivalTime** field from a character field to a Time field, click the **Type** drop-down arrow and select the Time type.
4. Click **OK** to save your change.

Adding Time or DateTime Data Types to Existing Data

If you have existing data and want to add Time or DateTime content to it, check the table below to ensure that the data is in a format that MapInfo Professional can recognize as Time or DateTime.

Time and DateTime Data Formats

Enter:	To Format for Time:	To Format for DateTime:
Date	Not Applicable.	**yyyyMMdd** Sets value to the specified Date at midnight.
Time	**HHmmssfff**. Can also use the locale settings for a Time string.	**HHmmssfff** Sets value to current date at specified Time. Can also use the locale settings for Date and Time strings separated by a space.
DateTime	**yyyyMMddHHmmssfff** Sets value to Time portion of DateTime value.	**yyyyMMddHHmmssfff**

where:

HH refers to hours, **mm** refers to minutes, **ss** refers to seconds, **ff** refers to fractions of seconds, **yyyy** refers to years, **MM** refers to month, **dd** refers to date

Converting Existing Data to Time or DateTime Data Types

If you have Time or DateTime data in your tables already, check to see if it is in the format you want by checking the **Time and DateTime Data Formats**. If you have a lot of data and it is not in the format you require for your tasks, you can use one of the MapBasic conversion functions to assist you with this process.

Converting	Date	Time	DateTime
String	Assumes the form yyyyMMdd or locale settings for a date string if Date format is "local" or the U.S. form if Date format is "US". *	String can be in the form HHmmssfff or can use the locale settings for a Time string. **	String can be in the form yyyyMMddHHmmssfff or can use the locale settings for Date and Time strings separated by a space. ***
Number	Assumes the form yyyyMMdd. If any portion of the Date is invalid the value is set to null. May display this error: "Could not convert data."	Assumes the form HHmmssfff. If any portion of the Time is invalid the value is set to null and display this error: "Could not convert data."	Assumes the form yyyyMMddHHmmssfff. If any portion of the DateTime is invalid the value is set to null and display this error: "Could not convert data."

Converting	Date	Time	DateTime
Date	No conversion	Sets value to null and display this error: "Could not convert data."	Sets value to the specified Date at midnight.
Time	Sets value to null. May display this error: "Could not convert data."	No conversion	Sets value to current date at specified Time.
DateTime	Sets value to Date portion of DateTime value.	Sets value to Time portion of DateTime value.	No conversion

Additional Notes for Converting a String

* to a Date

If the year is last in the current Date format, you can omit it and MapInfo Professional will assume the current year. If the data specifies a two-digit year, MapInfo Professional assigns the century based on the current Date Window. If the Date is invalid the value is set to null and MapInfo Professional may display this error: "Could not convert data."

** to a Time

MapInfo Professional accepts both military and AM/PM forms. The data can specify the entire locale in AM or PM strings or use just the first character of each. The data may omit the milliseconds, seconds, and minutes if the lower-order portions are also omitted. If the Time is invalid the value is set to null and MapInfo Professional may display this error: "Could not convert data."

*** to a DateTime

The conversion rules for Date and Time apply for the respective portions of the string. If the data omits the Time portion, MapInfo Professional assumes midnight. If the DateTime is invalid the value is set to null and MapInfo Professional may display this error: "Could not convert data."

Additional Notes for Converting a Number to a String

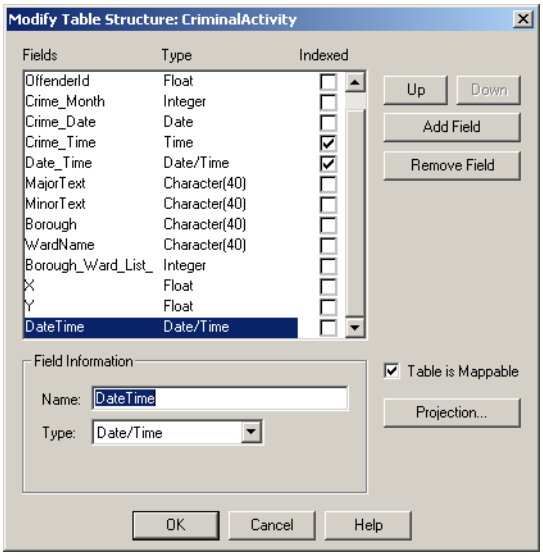
The conversion rules for Date and Time apply for the respective portions of the string. If the data omits the Time portion MapInfo Professional assumes the Time is midnight. If the DateTime is invalid the value is set to null and MapInfo Professional may display this error: "Could not convert data.".

If you have a lot of data and it is not in the format you require for your tasks, you can use one of the MapBasic conversion functions to assist you with this process.

Creating a DateTime Column from Two Separate Columns

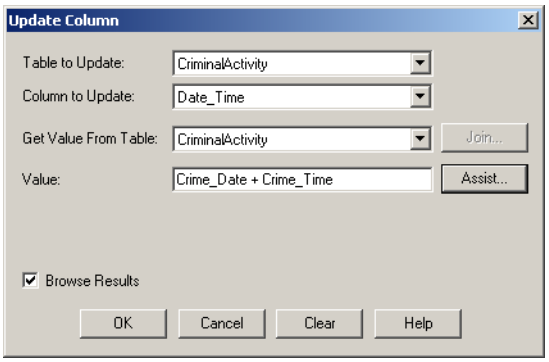
To create a DateTime column from a Date column and a Time column:

1. Open your data in MapInfo Professional Browser window. We use CrimeActivity.TAB from the Introductory Data on your CD.
2. Choose **Table > Maintenance > Table Structure** to display the Modify Table Structure dialog box.
3. Click **Add Field** and type a Date_Time label in the **Name** field.
4. Select **Date/Time** in the **Type** drop-down list and click **OK**.



5. Select **Table > Update Column** to display the Update Column dialog box.
6. Select the table name in the **Table to Update** drop-down list.
7. Select the name of the new column you just created in the **Column to Update** drop-down list.
8. Select the table name again in the **Get Value from Table** drop-down list.
9. Click the **Assist** button to display the Expressions dialog box.
10. Use the **Column** drop-down list to create the following expression and click **OK**:

```
DateColumnName + TimeColumnName
```



For more about using math expressions with Time and Date information, see **Using the Arithmetic Operators with the New Data Types on page 29**.

11. Click **OK** to update the new column with the Date and Time information.

Creating Thematic Maps using Time and Time/Date Data Types

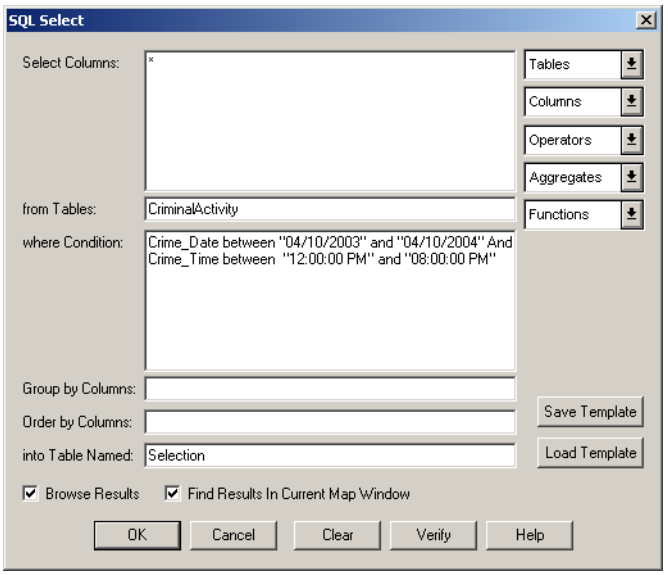
For ranged thematic maps, Time values will be able to be rounded by seconds, minutes, and hours. The default is **seconds**. When you select **None**, MapInfo Professional does not round the electing the seconds and displays a granularity of milliseconds.

Note: If your data is on a remote database, you may be interested in the **New Time and DateTime Data Type Support for Remote Databases on page 72**.

To create a thematic map using DateTime information:

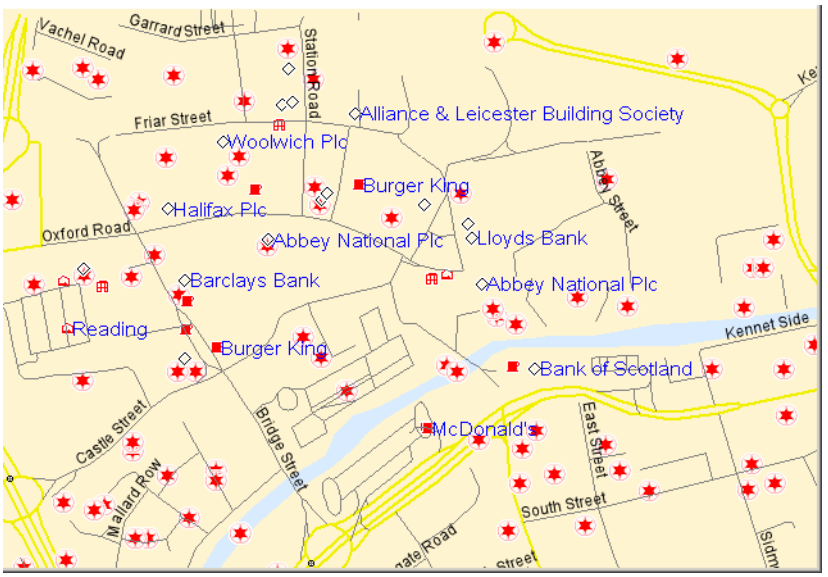
1. Open your data in MapInfo Professional Browser window. Use the appropriate background map to give your data perspective. Here we use the Great Britain data in the Introductory Data on the data CD.
2. Choose **Query > SQL Select** to display the SQL Select dialog box.
3. Place your cursor in the from **Tables** field and select the table name that contains the DateTime data in the **from Tables** drop-down list. For our example we used the CrimeActivity table.
4. To find out the location of crimes between April 10, 2003 and April 10, 2004 and between the hours of 12 and 8 p.m., we entered this text in the **where Condition** box:

```
Crime_Date between "04/10/2003" and "04/10/2004" And Crime_Time between
"12:00:00 PM" and "08:00:00 PM"
```



5. Select the **Browse Results** and **Find Results in Current Map Window** check boxes to display the results.

6. Click **OK** to create the query and display the results.



We used the UKCrimeExample data to create this map. This data is available in the Introductory Data/World/Europe/UKCrimeExample folder of the Data CD that ships with MapInfo Professional.

Using the Arithmetic Operators with the New Data Types

You can use the addition and subtraction operators with the new data types as follows:

Data type	Operator	Data type	Result	Notes
Time	minus (-)	Time	Number	The number represents the number of seconds between two times as a floating point number. The fractional part of the result represents milliseconds.
Time	+ or -	Number	Time	The number represents the seconds to add to the first Time. The Time wraps around midnight so that 11:59 PM + 120 seconds equals 12:01 AM.
DateTime	minus (-)	DateTime	Number	The number represents the number of days between two DateTimes as a floating point number. The fractional part of the result is the fractional portion of a day, as in today at noon minus today at midnight equals one half day.
DateTime	+ or -	Number	DateTime	The number represents the number of days to add to the first Time.

Using the Comparison Operators with the New Data Types

The comparison operators are **=, <>, <, >, <=, >=** and should all work as expected for the Time and DateTime values. For Time values, the smallest Time is "12:00:00.000 AM" while the largest Time is "11:59:59.999 PM".

The "Between" operator works as expected for DateTime values. For Time values, we support wrap-around comparisons. For example:

TimeValue Between "2:00 AM" And "10:00 PM" is true if the TimeValue is greater than or equal to "2:00 AM" and less than or equal to "10:00 PM"

TimeValue Between "10:00 PM" And "2:00 AM" is true if the TimeValue is greater than or equal to "10:00 PM" and less than or equal to "11:59:59.999" **or** greater than or equal to "12:00 AM" and less than or equal to "2:00 AM"

Using the Logical Operators with the New Data Types

A Time or DateTime field with a value is **true**, while the same field with a null value indicates **false**. The behavior of the logical operators And, Or, and Not should follow logically from this.

Interpreting Excel Data

Using Excel you can format numeric cells as Dates and/or Times. In previous versions, MapInfo Professional supported Date fields with the format 'y' (year), 'm' (month), or 'd' (day). Time fields within the format 'h' (hour) or 's' (second) were treated as Float fields. Fields with Date and Time format codes were treated as a Date field and the Time information was ignored. Excel determines the meaning of the ’m’ format code as either ’month’ or ’minute’ based on the rest of the format code. With the introduction of these new data types:

Fields registered with	Are Treated As...
Date format but not Time format	Date fields
Time format but not Date format	Time fields
Date format and Time format	DateTime fields

Note: If you want to use both the Date and Time data from tables registered with earlier versions of MapInfo Professional, you can re-register the tables.

Interpreting Microsoft Access Data

Access data uses a DateTime type, but not separate Date or Time types. In the past, MapInfo Professional interpreted these fields as Date fields. With the introduction of these new data types, MapInfo Professional registers the Access DateTime type fields as DateTime fields.

Note: The Date fields in any of your existing MapInfo Professional files are still treated as Date fields until you re-register them to use the new DateTime data type.

When you save a MapInfo table to Access format, MapInfo Professional writes Date, Time, and DateTime fields as Access DateTime fields. The .tab file itself maintains the Date, Time, and DateTime types so when you reopen the file, the Date, Time, or DateTime data displays. If you attempt to open these .tab files using a non-MapInfo application, these fields display as DateTime.

Interpreting dBase Data

The dBase format supports Date fields but does not explicitly support Time or DateTime fields. Therefore, when you register an existing dBase file, there will be no Time or DateTime fields. When you save or export a MapInfo table with Time or DateTime fields to a dBase file, Time and DateTime fields are written out as character fields of length 9 and 17, respectively so that the data is written out in numeric formats.

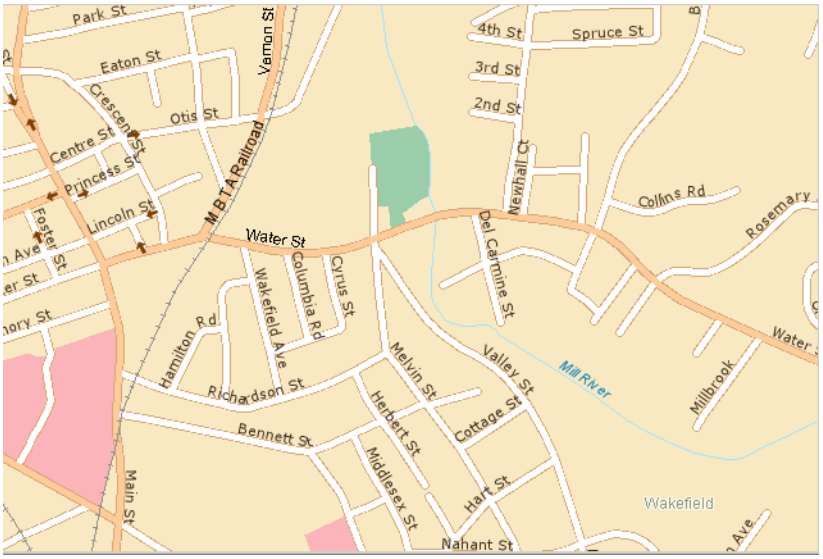
When you save a new MapInfo table to dBase format, the .tab file maintains the Time and DateTime types so that when you reopen it the data will displays as either Time or DateTime. If you attempt to open these .tab files using a non-MapInfo application, these fields display as character fields.

Related topic in the *Help System*:

- Interpreting ASCII and CSV Data

Curved Labels Improve the Look of Your Maps

You can improve the look of your arc and polyline labels by making these labels follow the curve of the line. Curved labels can display for any arc/polyline feature, such as streets, railroads, ferry lines, and rivers. This functionality is supported in the Map window and persists when you move the map to a Layout, however you cannot create curved labels in the Layout window itself.



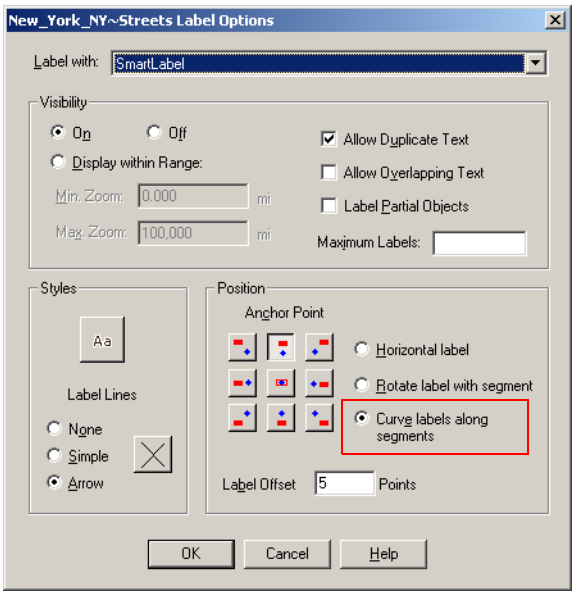
Here there are curved labels on the Streets, Railroads, and WaterRivers layers.

Setting the Curved Label Option

The curved label option gives you more control over the way your labels display.

To display labels along a curve:

1. Display the map you want to change the labels for.
2. Click to display the Layer Control dialog box.
3. Highlight the layer that contains the labels you want to change and select the **AutoLabel** check box.
4. Click the **Labels** button to display the Label Options dialog box.



5. To ensure that the layer labels are visible, click the **On** button in the Visibility pane.
6. Click the **Curve labels along segments** option to display the layer's labels along the curve of the line. These labels are anti-aliased automatically to improve the display.

   Note: If you use **Anchor Points** to set the label's position, when you select:

   Left, the curved labels are left-justified starting at the beginning of the arc/polyline

   Center, the curved labels are centered on the midpoint of the arc/polyline

   Right, the curved labels are right-justified at the end of the arc/polyline

   Note: The length of the polyline(s) affect how the label is positioned. The longer the polyline(s), the more predictably the labels display.
7. Click **OK** to save this option and **OK** again to display the new label(s).

Editing Curved Labels

All of the editable properties of curved labels are supported in the workspace.

You can use the Label tool on the Main toolbar to move curved labels. Make sure you have already selected the **Curve labels along segments** option in the Label Options dialog box for the layer you want to change. In these instructions, we use the term line to mean polyline or arc segment.

1. Click on the Main toolbar to display the Layer Control dialog box.
2. Highlight the layer you want to move the labels for in the list.
3. Select the **Selectable** check box in this layer.
4. Click **OK** to redisplay the Map window.

5. Click on the Main toolbar.
6. Click the line on which you want to reposition the label.
7. Click the new location for the label until the label displays as you want it to.

   Note: If the segment you select does not have a label name associated with it in the data, no label displays. If MapInfo Professional cannot edit the label, the Label tool beeps to indicate an error.

Understanding your Data and Curved Labels

When you select curved autolabeling, MapInfo Professional attempts to create a curved label for every arc/polyline record in a map, just as it does for non-curved labels.

For example, in street maps, the street can be made of several polylines or one long polyline. The length and number of the polylines, the rules that govern whether a curved label can be created, and the labeling options you choose, all affect which curved labels are created and where they display.

Some polyline and arc segments in your layer data may not contain label name entries. When this occurs, MapInfo Professional cannot display labels for that segment.

What to Expect from Curved Labels

This feature is made up of complex algorithms that are designed to enhance the display of your polyline/arc features. There are several rules which determine whether MapInfo Professional can display a curved label.

- MapInfo Professional can only draw curved labels using TrueType fonts. If you select a non-TrueType font, MapInfo Professional substitutes a comparable TrueType font, so, the label you chose may display differently than you expect. Also, if you change a horizontal label using a non-TrueType to a curved label, the new label may display differently due to the font substitution.
- Part of the label string must fit along the polyline/arc that it is labelling. If it cannot fit, MapInfo Professional determines that the label is too long and throws it away
- MapInfo Professional cannot draw curved labels for polylines that are very jagged, however, it depends on the curvature of the line
- Labels that curve onto themselves are thrown away and do not display
- Curved labels follow the same rules for overlap detection, duplicate text, and partial segment labeling as non-curved labels. Each of these rules affect how and when MapInfo Professional displays the labels
- You cannot drag curved labels as you can other labels
- You can create curved labels with the Label tool at any point along a polyline/arc
- You can reposition the curved auto labels with the Label tool
- Curved and non-curved labels persist for layers in the workspace
- The Labeler utility does not support curved labels, so you cannot transfer curved labels to the Cosmetic layer
- The curved labels functionality supports double byte characters
- The Label Lines controls are disabled whenever you select the **Curve labels along segments** option
- You cannot underline curved labels

Using Universal Data Directly

Many of our customers who use **AutoCAD®**, **Microstation Design®**, **ESRI ArcSDE®** and **Personal Geodatabase®** data have asked us for a simpler and more direct way to open it. This new feature allows you to open and set the display properties of this data directly. By opening this data directly you avoid having to translate it separately and work with copies of the data in .tab format. This new functionality ensures that you will have more flexibility when working with your data.

MapInfo and Safe Software, a third-party partner, have worked together to provide this more direct way to open and display universal data directly in MapInfo Professional.

Using Safe Software's Feature Manipulation Engine (FME), you can access this data directly:

- ESRI ArcSDE
- ESRI Personal Geodatabase (*.MDB)
- AutoCAD.DWG/DXF
- Microstation Design (*.DGN)
- ESRI ArcInfo Export (*.E00)
- USGS Spatial Data Transfer Standard (*.CATD.DDF)
- VPF NIMA/NGA (*.FT)

Using the Open Universal Data feature of MapInfo Professional, you can open different types of data stored in a variety of locations and:

- Combine data from multiple sources into a single run and join data from incompatible systems
- Extend the use of legacy systems
- Exchange data between CAD-based systems and GIS systems
- Perform quality assurance tests on spatial data

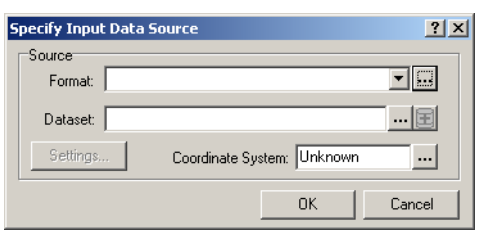
Additionally, if you have the FME Suite, which is available from Safe Software, you can use this feature to open almost 150 formats within MapInfo Professional. For more information about extending MapInfo Professional in this way, see **Extending MapInfo Professional with FME Suite on page 39**. This feature is based on the FME 2007 release.

Opening Universal Data Directly

The process for opening this data is the same regardless of the format.

To open the universal data directly:

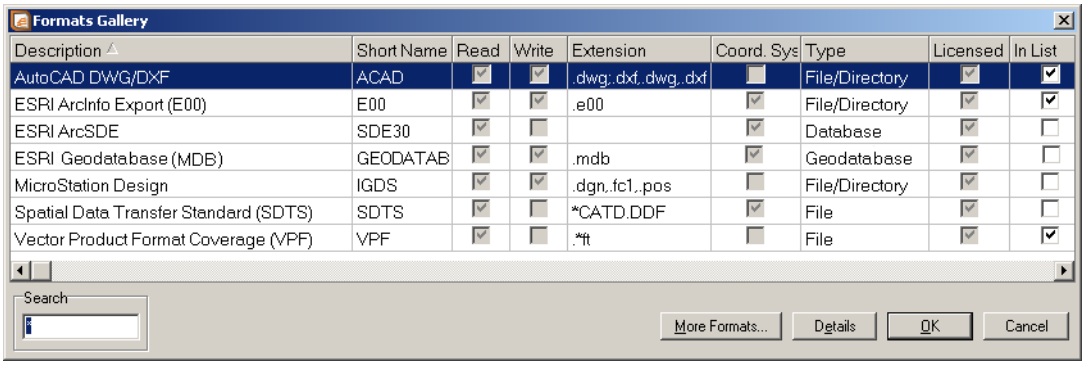
1. Choose **File > Open Universal Data** to display the Specify Input Data Source dialog box.



Use this dialog box to select the data you want to open and specify the name of the dataset you want to display.

Some formats are file-based and for others you need to specify a data source. Here, a dataset is defined as a set of data in the same format. Some data contains the coordinate system information in it and others do not. You may need to specify the coordinate system projection for the data you are attempting to open.

2. Beside the **Format** drop-down list, click the **Ellipsis** button to specify the data format you want to open. The Formats Gallery displays.



From this dialog box you can select a format and import frequently used formats.

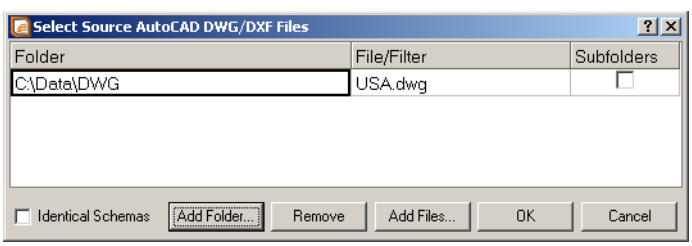
Note: Personal Geodatabase and ArcSDE always display in the Formats Gallery but they may be grayed out if you do not have the appropriate client DLL or applications installed. See **Setting the ArcSDE Data Options** and **Setting the ESRI Personal Geodatabase Data Options** in the *Help System* for these details.

To obtain a free trial of the FME Suite and add more formats to this list, click **More Formats**.

Highlight a format in this list and click **OK** to return to the Specify Input Data Source dialog box.

3. Click the **Ellipsis** button beside the **Dataset** field to select the data you want to open.

To open a folder of data, click the **+** button beside the **Ellipsis** button. The Select Source Files dialog box displays.



If you select a folder in this dialog box, MapInfo Professional opens all of the data of the specified format it finds in this folder. If you select the **Subfolders** check box, MapInfo Professional also opens all of the data with the specified format in the subfolders as well. This data is merged together when you open it. To add:

Directory-Based Formats: Click **Add Folder** to browse for a specific directory name. Check the **Subfolders** box to include all subfolders below that directory. Click **OK**. The new data appends to the original data.

File-Based Formats: You can type directly in the **Folder** field, and use wildcards to include all files of a specific format. For example:

```
*.dgn
```

merges all the .dgn files on your C drive. Check **Identical Schemas** if the files have the same schema.

- Click **Add Files** to select individual files
- **Ctrl**+Left-click to select multiple files
- Click **Remove** to delete single or multiple files based on your selection

Click **OK**. The new data appends to the original data. The Specify Data Input Source dialog box redisplays.

4. If the coordinate system for the data you selected is **unknown**, you need to specify it in the **Coordinate System** field. Click the **Ellipsis** button beside the field to select the appropriate projection and click **OK**. If you do not specify the coordinate system here, you will be prompted later. For more about this feature, see **Coordinate System Behavior and Universal Data on page 38**.

5. Click **Settings** to display the settings options for this file type. The options in these dialog boxes depend on the format you selected. To learn more about these settings, see the these topics in the *Help System*:

   Setting the AutoCAD Options

   Setting the ArcInfo Export File Options

   Setting the ArcSDE Data Options

   Setting the ESRI Personal Geodatabase Data Options

   Setting the Microstation Design File Options

   Setting the Vector Product Format Coverage Settings

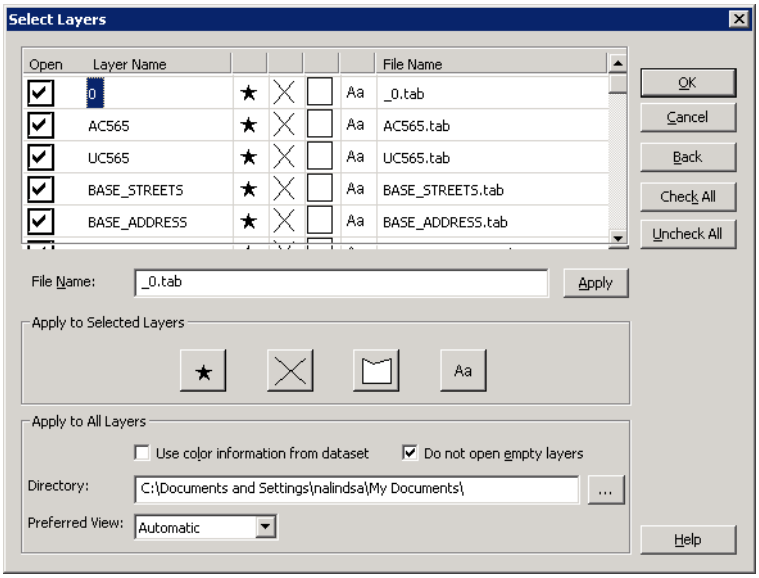
   Note: The Spatial Data Transfer Standard data does not have settings options.

   It is possible that a style option s will not show. If it's the case it means that the layer(s) in question does (do) not have any geometry objects (only attributes).

6. When you have completed your settings, click **OK** to open the data you selected.

   If you did not specify the coordinate system in **step 4** and the coordinate system is unknown, the Choose Projection dialog box displays, allowing you to select the projection for the data you are opening. Select the appropriate projection for the data and click **OK**. The system defaults to your Table Projection setting in the Map Window Preference if you do not select a projection here. See **Coordinate System Behavior and Universal Data on page 38** for more information. The Select Layers dialog box displays.

MapInfo Professional opens all layers with the Open check box selected.



Use this box to specify the layers to open and then specify the layer display options.

To change the name of the layer, click it, type a new name in the **File Name** field and click **Apply**. Use the **Check All** and **Uncheck All** buttons to select or deselect the **Open** check box for all of the layers. Click the **Back** button to return to the Specify Input Data Source dialog box.

7. Now you are ready to select the layers to which you will apply the new display options. All layers you select together will share the same display characteristics.
   - To change the display options of all layers, click the layer name of the first layer, press the **Shift** key, and click the layer name of the last layer
   - To change the display options of some layers, click the layer name of the first layer, press the **Ctrl** key, and click the other layers that require the same change
   - To change the display options of one layer, click the layer name of the layer
8. Once you have selected the layer(s), use the display buttons to make the changes you require. If the layer(s) you are changing contain:
   - Point data, click the **Symbol Style** button to change the symbol options
   - Line data, click the **Line Style** button to change the line options
   - Region data, click the **Region Style** button to change the background options
   - Text data, click the **Text Style** button to change the text options

   Note: If you want to open maps based on data that is thematically related, assign the same styles to the layers that contain that information.
9. Once you have completed your layer display options, consider the options that affect the whole data source. You can select from these options:
   - Use color information from data
   - Do not open empty layers
10. Use the **Directory** field to specify the path to which you want to save the resulting data. Click the **Ellipsis** button beside the field to navigate to the appropriate directory.

11. Select the viewing options from the **Preferred View** drop down box, as you would when opening any other data.

12. When you have completed your selections, click **OK** to open the data according to the settings you have specified. A status bar displays to indicate the progress and the data displays.

Note: For any terminology that might not be familiar to you, review the FME Suite *Help System*.

Avoiding Out of Disk Space Errors when using Universal Data

When you open universal data using this new feature, the data is stored locally temporarily so you can reopen it faster the next time you use MapInfo Professional. For example, the temporary file folder location for Windows XP is:

```
C:\Documents and Settings\<user id>\Local Settings\Application Data\
MapInfo\MapInfo\Professional\900\UniversalDataCache\
```

Note: Paths in this explanation are based on installations on Windows XP and Windows 2000 operating systems. Vista operating system users need to consult their system documentation for the right path for their installation.

If you find that you are opening large files with many layers using this feature, these files can get very large and may impact the performance of your system. If you see `Out of Disk Space` errors, you may want to delete these files to see if this data is the cause of the error. Whenever you delete temporary files, you will have to reopen that stored data to display it again.

Coordinate System Behavior and Universal Data

Some of the universal data you are working with contains coordinate system information and some do not. If you are opening Spatial Data Transfer Standard data and some of the ESRI data, the coordinate system information entry is handled for you. Coordinate system information for AutoCAD, Microstation Design and VPF data must be specified, although VPF data is usually in the Longitude/Latitude WGS 84 projection.

Refreshing the Universal Data

You can refresh the data from the original data source using the Universal Data Table Refresh command. This allows you to incorporate changes to the original data in your new MapInfo Professional map.

To refresh the universal data:

1. The data you want to refresh must be open in the Map window.

2. Choose **Table > Universal Data Table Refresh**. The Select Tables dialog box displays.

3. Highlight the table(s) you want to refresh in the list and click **Select**. A status bar displays to indicate the progress and the layers are refreshed.

Working with the FME Suite

If you install the FME Suite from Safe Software, you can open even more formats from within MapInfo Professional. To extend MapInfo Professional to use these additional formats, use the FME Administrator tool that ships with the FME Suite. There are a couple of caveats to keep in mind:

- Make sure that the version of the FME Suite that you are using is the same version or later than the that which has been integrated with MapInfo Professional. This means you must have FME Suite 2007 or later. This works on a build number basis, so even a minor update to MapInfo Professional or FME Suite could result in discrepancies between the products and could prevent you from opening particular formats.
- MapInfo localizes the dialog boxes of the FME product that we use in MapInfo Professional. However, when you extend MapInfo Professional with the FME Suite, this functionality is effectively run from the FME Suite, using the FME Suite dialog boxes.
  For example, if you are running the Japanese version of MapInfo Professional and you install the English version of the FME Suite, the dialog boxes that display for this feature will be in English. If you revert to the MapInfo Professional implementation of this feature, the translated dialog boxes will display in Japanese.

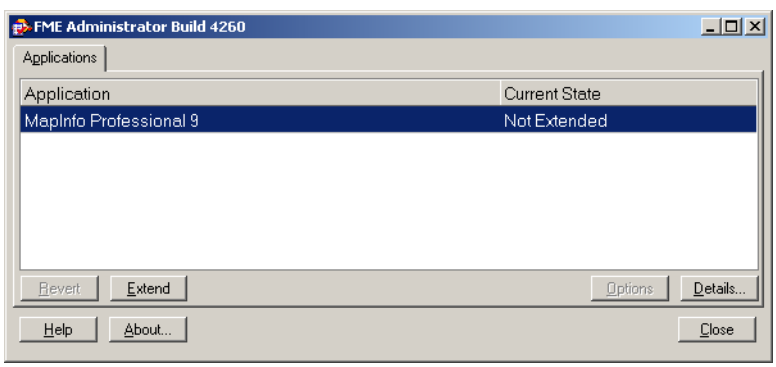
Note: Raster/grid formats and MapInfo TAB/MIF formats are not available when you extend MapInfo Professional with the FME Suite.

Extending MapInfo Professional with FME Suite

You must have a valid FME Suite License to extend MapInfo Professional to open additional data source formats.

To open even more universal data source formats in MapInfo Professional:

1. Choose **Start > All Programs > FME > FME Administrator** to display the FME Administrator dialog box.



2. To extend MapInfo Professional, click **Extend**.

   If you have extended MapInfo Professional and want to return to MapInfo Professional Universal Data functionality only, click **Revert**. You might want to revert to MapInfo Professional if you have the Base FME Suite and you want to work with ArcSDE data.

3. Click **Close** to close the FME Administrator.

Using Templates for Layouts

Producing professional quality maps for printing or other output can be done quickly and easily with MapInfo Professional's Layout Templates feature.

A layout template is a user-defined workspace that contains a Layout window with placeholders for maps, other windows, and additional elements in a specific arrangement for presentation. You can create a layout from one of the templates that MapInfo Professional comes with, or from a template that you create using Layout Templates.

The Layout Templates feature provides a set of tool buttons that enable you to create, edit, and save layout templates. Configuration options enable you to keep layout templates organized and set the default layout template.

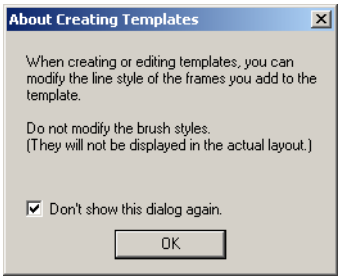
You can create different layout templates to accommodate your map presentation needs. For example, if you frequently use a combination of a map, browser, and legend in your layouts, you can create a layout template that contains placeholders for each of those window types. You can then create different layouts based on the same template without having to create each layout manually.

This section guides you through creating a layout template first and then shows you how to create a layout from a template.

Accessing Template Creation Tools

To access the tools you need to create a layout template:

1. Close any open windows. You will be prompted to close open windows later if you do not close them now. No windows can be open when you create or edit a layout template because the windows would be written to the workspace when you save the layout template.
2. Choose **Tools > Layout Templates > Create New Template**.
3. The About Creating Templates dialog box displays on the screen.

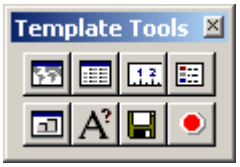

About Creating Templates
When creating or editing templates, you can modify the line style of the frames you add to the template.
Do not modify the brush styles.
(They will not be displayed in the actual layout.)
Don't show this dialog again.
OK

   The About Creating Templates dialog provides important information about editing templates and enables you to control the display of the About Creating Templates dialog box.

   The **Don't show this dialog again** check box is selected by default. Selecting the **Don't show this dialog again** check box prevents the About Creating Templates dialog box from displaying every time you create a layout template.

4. Click **OK**.

The Template Tools toolbar displays on the screen.



Creating Layout Templates

A layout template enables you to create and save an arrangement of maps, browsers, graphs, legends, and additional elements for presentation. When you save the template, it is saved as a workspace so that you can retrieve it easily for future use.

The tool buttons in Template Tools enable you to add placeholders for the different elements in the layout. These elements include the different types of MapInfo Professional windows (map, browser, graph, and legend), a scalebar, and text objects. You can control each element's size and its position in the layout. Additional tool buttons enable you to save the layout template, and cancel the creation of the layout template without saving it.

Each tool is described below:

Add Map–Adds a map frame to the layout template.

Add Graph–Adds a graph frame to the layout template.

Add Browser–Adds a browser frame to the layout template.

Add Text–Adds a text object placeholder to the layout template.

Add Scalebar–Adds a scalebar frame to the layout template.

Save Template–Use the Save Template tool button to save the layout template as a workspace.

Add Legend–Adds a legend frame to the layout template.

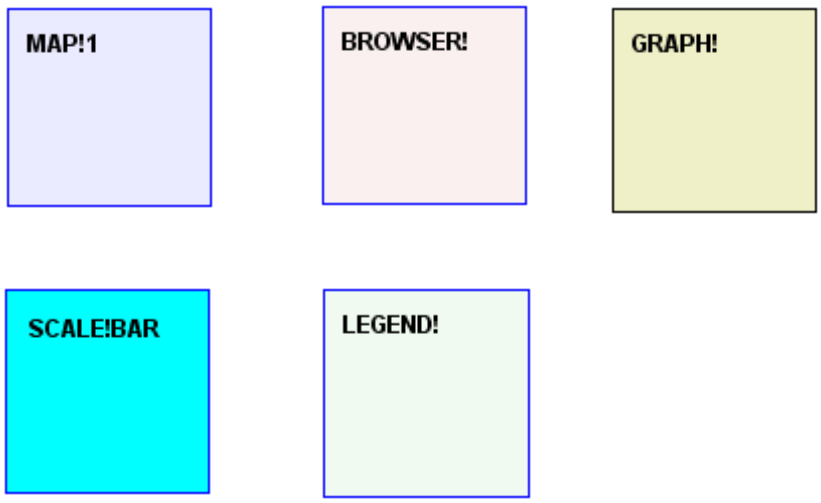
Quit Template without saving–Use the Quit Template tool button to cancel the creation of the layout template.

Adding Map Elements

Adding maps, browsers, graphs, legends or scalebars to a layout template follows the same procedure.

When you add a map element to the layout template, you are adding a frame that acts as a placeholder for that specific element, rather than adding the element itself. The tools enable you to specify which element you want the frame to represent in the template.

Each map element's frame has a color fill to help you distinguish between each map element. The window types are also labeled inside the frame. The color and fill for each map element is illustrated below:



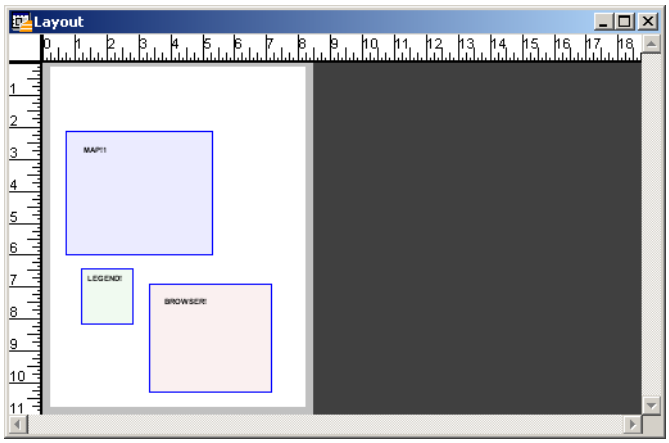
You can modify the borders of the placeholder frames, but you cannot modify the fill. Modifying the fill of the placeholder frames will produce an error when you use the template.

You can modify the style of the placeholder labels (text objects), but you cannot modify the placeholder text itself. Modifying the placeholder text creates unexpected results when you use the template. The placeholder text does not appear when the template is used.

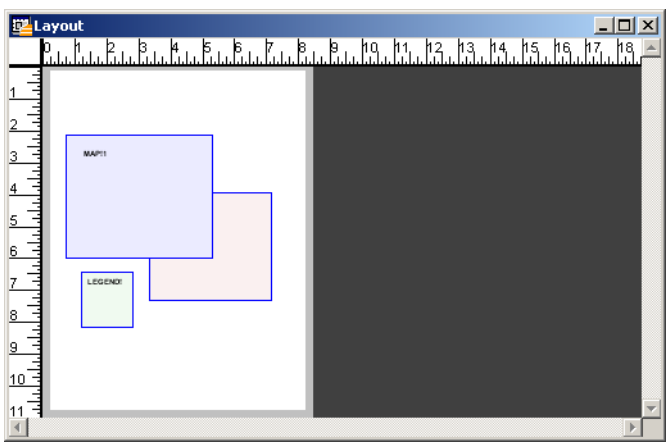
To add any map element to a layout template:

1. For the map element you want to add, click the corresponding tool button. For example, click the Add Map tool to add a map frame; click the Add Browser tool to add a browser frame, etc.
2. Move your cursor over the Layout window. The cursor becomes a crosshair. Click on the Layout window at the desired position for the map element and hold down the mouse.
3. Drag the mouse across the Layout window to create a frame.
4. When the frame reaches the desired size, release the mouse. A frame that represents the map element you specified displays on the screen.
5. Using the Select tool in the Main toolbar, adjust the size and position of the frame.

Here is an example of a layout template with a map, browser, and legend added to the Layout window.



Because you are working in the Layout window as you create the template, you can use any of the Layout menu commands to adjust frame position, bring windows to the front or back, or specify other Layout window options. Here is an example of the same layout template with the Map and Browser window positions adjusted and the Map window brought to the front.

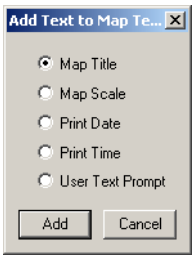


Adding Text

The Add Text tool button enables you to add text object placeholders to your layout template. The text placeholder is a textual description of what the actual text should be. For example, the placeholder might say "Map Title" to prompt you that the text should be the title of the map. You can select text placeholders from a list of text categories, or you can define your own text placeholder.

To add a text placeholder to a layout template:

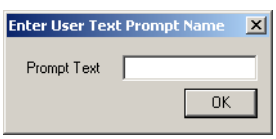
1. Click the **Add Text** tool button.
2. Move your cursor over the Layout window. The cursor becomes a crosshair. Click on the Layout window at the desired position for the text. The Add Text to Map Template dialog box displays on the screen.



3. Select what you want the text placeholder to represent. Choose from the following text categories:
   - **Map Title**–Indicates the map title text.
   - **Map Scale**–Indicates the map scale.
   - **Print Date**–Indicates the date that the map was printed.
   - **Print Time**–Indicates the time that the map was printed.
   - **User Text Prompt**–Indicates a user-defined text category. You can define a category of text. and create a placeholder in the layout template for it. This is useful if you have other text annotations that you use regularly, but that do not fall into any of the pre-defined categories.

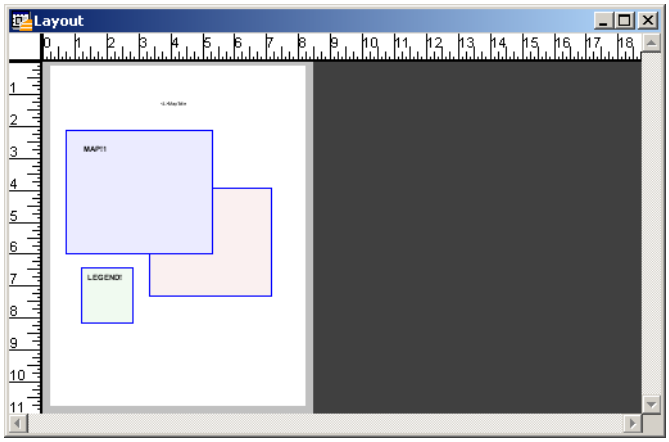
   Click the button next to the text category you want to add, and then click **Add**.
   - If you selected **User Text Prompt**, go to **step 4**
   - If you selected any of the other categories, go to **step 5**.
4. If you selected **User Text Prompt**, the Enter User Text Prompt Name dialog displays on the screen. Enter the text prompt you want to use in the box and click **OK**.

   Be sure that your user text prompt is meaningful in terms of the map presentations you are going to create with this template. There is a 200-character limit for user defined text.



5. When you select a text category, the text placeholder immediately displays in the Layout window at the position you clicked.
6. Using the **Select** tool on the Main toolbar, adjust the position of the text.
7. Using the **Text Style** tool on the Drawing toolbar, you can adjust the size and other style features of the text.

Here is an example of our earlier layout template, except it now has a map title added to it.



If you want to make the map title larger, using the Select tool from the Main toolbar, double-click on the map title placeholder. The Text Object dialog box displays on the screen. Click the Style button to change the size or other style elements of the text.

Adding Drawn Objects

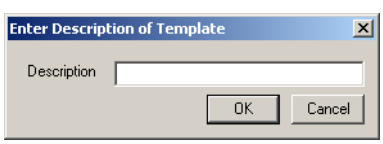
You can also add drawn objects to a layout template using the tools on the Drawing toolbar.

Drawn objects can be useful in a layout template if there is an object that you want to use in a number of layouts. The template enables you to draw the object and adjust its position once, and then reuse it as many times as you need to. You do not have to remember the object size, position, or style attributes because the object is part of the template.

Saving Layout Templates

Layout templates are saved as workspaces. To save a layout template:

1. Click the **Save Template** tool. The Specify workspace file to save template as dialog box displays on the screen.
2. In the **Save in** box, leave the folder as is. The layout template workspace must be saved to this location. If you try to save the workspace to another location, you will get an error.
3. In the **File name** box, enter a filename for the layout template. The default filename is Layout.
4. In the **Save as type** box, select the .wor workspace type. The default type is .wor.
5. Click **Save**. A MapInfo dialog box displays on the screen. The dialog box asks you if you want to add a new entry to the list of print templates.
6. Click **Yes** to add a new entry to the list of print templates. The Enter Description of Template dialog box displays on the screen.



7. Enter a description for the template.This description identifies the layout template. The description of the layout template appears in template lists when you perform the following tasks:
   - Configure layout templates.
   - Create a layout from a template.

   Click **No** if you do not want to add a description of the layout template. The template will be saved as a workspace, but it will not appear in the Templates lists for configuration and for creating a layout from a template.
8. Click **OK**. The layout template is created, and the Layout window and the Template Tools close.

Stopping Work without Saving

You may decide part way through your work on a layout template that you do not want to finish it. You can easily stop creating the template without saving it using the Quit Template without saving tool.

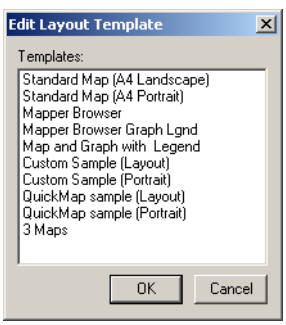
To stop work on a layout template without saving it:

1. Click the **Quit Template without saving** tool. A MapInfo dialog box displays on the screen. This dialog box asks you if you want to quit the layout template without saving it.
2. Click **Yes**. The Layout window closes without saving the layout template.

Editing Layout Templates

Editing a layout template enables you to make changes to a layout template that you've already created. To edit a layout template:

1. Close all open windows. No windows can be open when you create or edit a layout template because the windows would be written to the workspace when you save the layout template.
2. Choose **Tools > Layout Templates > Edit Template**. The Edit Template dialog box displays on the screen.



3. Click on the layout template you want to edit to highlight it.
4. Click **OK**.
5. The Layout window opens using the selected layout template. The Template Tools toolbar also displays on the screen.

6. Make the desired changes.
7. Click the **Save Template** tool button when you are finished.

When you edit a layout template, you can use any of the Template tools to add additional windows, a scale bar, or text. You can also use any of the drawing tools on the Drawing toolbar to add drawn annotations to your layout such as geometric objects and additional text annotations. Finally, you also have all the Layout menu commands at your disposal to make final adjustments to the windows, create drop shadows, or change the zoom.

You can modify the borders of the placeholder frames, but you cannot modify the fill. Modifying the fill of the placeholder frames will produce an error when you use the template.

You can modify the style of the placeholder labels (text objects), but you cannot modify the placeholder text itself. Modifying the placeholder text creates unexpected results when you use the template.

Configuring Layout Templates

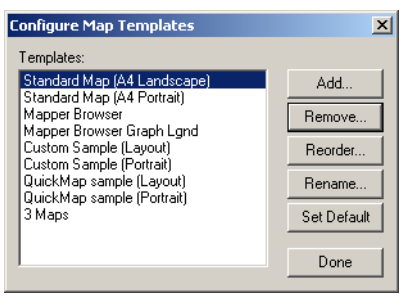
Configuring layout templates enables you to perform several tasks that help you manage and organize your layout templates.

You can perform the following configuration tasks:

- Add a template.
- Remove a template.
- Reorder a template.
- Rename a template.
- Specify the default template.

You will see any configuration changes the next time you create a layout from a layout template. The Create Layout from Template command in the Map menu displays the Configure Layout dialog box. The **Templates** list in the Configure Layout dialog box reflects any configuration changes you made. See **Creating a Layout From a Template on page 52** for more information.

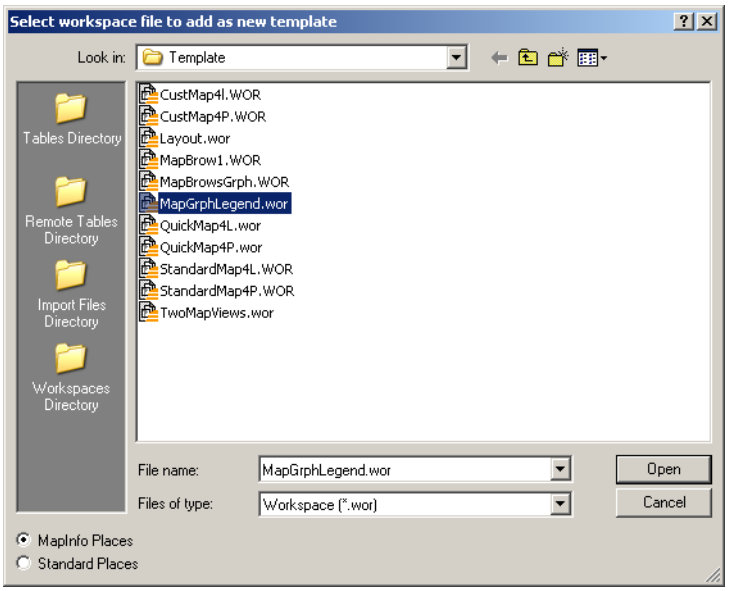
To configure layout templates, choose **Tools > Layout Templates > Configure Templates**. The Configure Map Templates dialog box displays on the screen.



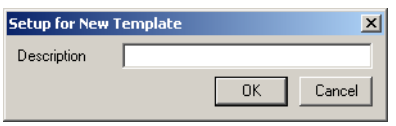
Adding Layout Templates

Use the **Add** button to add a layout template to the **Templates** list. Adding a layout template is a good way to share templates with others. Once you add the layout template workspace to your Template directory, you can add it to the **Templates list**.To add a layout template:

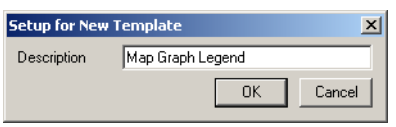
1. Click **Add**. The Select workspace file to add as new template dialog box displays on the screen.



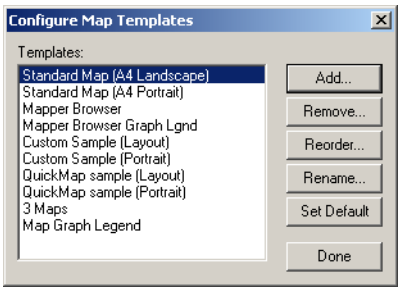
2. In the **File name** box, enter the name of the workspace file (*.wor) that you want to add to the Templates list.
3. Click **Open**. The Setup for New Template dialog box displays on the screen.



4. Enter a description of the layout template you are adding in the **Description** box. This description identifies the layout template.



5. Click **OK**. The description of the layout template appears in the **Templates** list.



6. Repeat this procedure for each layout template you want to add.
7. Click **Done** in the Configure Map Templates dialog box when you are finished.

The next time you create a layout from a template, the additional template(s) will also appear in the **Template** drop-down list in the Configure Layout dialog box.

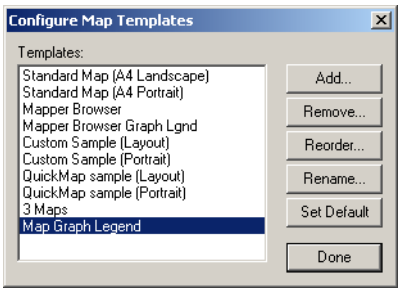
Removing Layout Templates

Use the **Remove** button to remove a layout template from the **Templates** list.

Note: Removing a template does not delete the layout template workspace; it only removes the layout template from the **Templates** list.

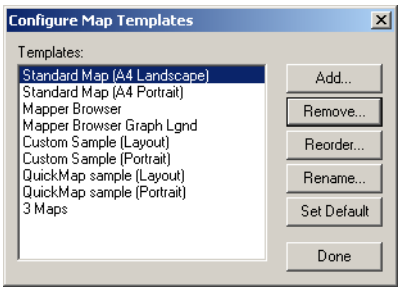
To remove a layout template:

1. Click on a layout template in the **Templates** list to highlight it.



2. Click **Remove**.
3. A MapInfo message dialog box displays on the screen. This dialog box asks you if you want to remove the selected layout template.

4. Click **Yes**. The template is removed from the **Templates** list.



5. Repeat this procedure for each layout template you want to remove.
6. Click **Done** in the Configure Map Templates dialog box when you are finished.

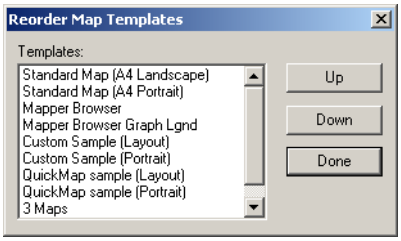
The next time you create a layout from a template, the selected template(s) is also removed in the **Template** drop-down list of the Configure Layout dialog box.

Reordering Layout Templates

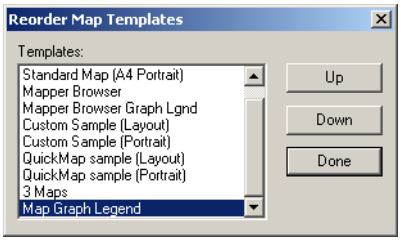
Use the **Reorder** button to change the order in which the layout templates appear in the **Templates** list.

To change the order of layout templates:

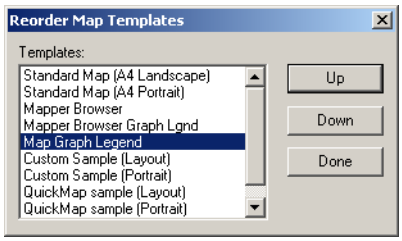
1. Click **Reorder**.
2. The Reorder Map Templates dialog box displays on the screen.



3. Click on a layout template in the **Templates** list to highlight it.



4. Use the **Up** and **Down** buttons to move the selected layout template up or down in the **Templates** list. Each time you click either the **Up** or **Down** button, you move the selected template up or down one place in the **Templates** list.

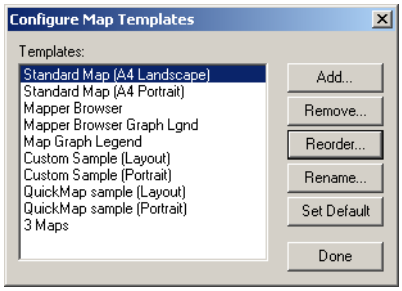


   In this example, the Map Graph Legend template has been moved up several places in the Templates list using the **Up** button.

5. Repeat this procedure for each layout template that you want to reorder.

6. Click **Done** in the Reorder Map Templates dialog box when you are finished.

7. Click **Done** in the Configure Map Templates dialog box when you are finished. The new layout template order appears in the **Templates list** of the Configure Map templates dialog box.



The next time you create a layout from a template, the new template order will also be reflected in the **Template** drop-down list of the Configure Layout dialog box.

Renaming Layout Templates

Use the **Rename** button to change the description of a layout template.

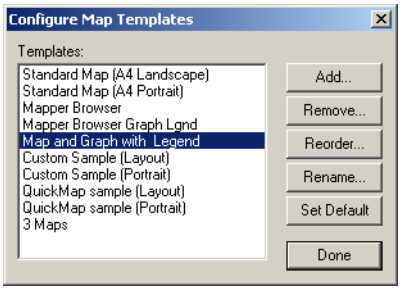
To rename a layout template:

1. Click on a layout template in the **Templates** list to highlight it.

2. Click **Rename**. The Enter new description for template dialog box displays on the screen. The description of the selected template is displayed in the **Description** box.

3. Enter the new description text in the **Description** box.

4. Click **OK**. The new description of the selected layout template displays in the **Templates** list of the Configure Map Templates dialog box.



5. Repeat this procedure for each layout template you want to rename.
6. Click **Done** in the Configure Map Templates dialog box when you are finished.

The next time you create a layout from a template, the new template name(s) will also be reflected in the **Template** drop-down list of the Configure Layout dialog box.

Setting the Default Template

Use the **Set Default** button to specify the default layout template. The default layout template is the layout template that is used when you create a layout from a template and do not specify a template. To set the default layout template:

1. Click on a layout template in the **Templates** list to highlight it.
2. Click **Set Default**.
3. Click **Done** in the Configure Map Templates dialog box when you are finished.

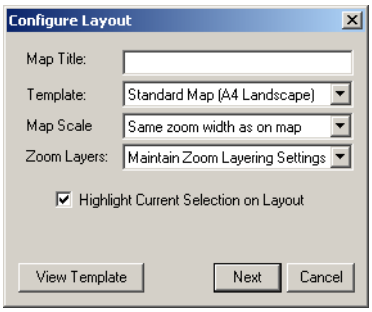
Exiting the Layout Templates Tool

When you choose **Tools > Layout Templates > Exit**, the Layout Template tool closes and is no longer available from the Tools menu. To reload Layout Templates, choose **Tools > Tool Manager**. In the Tool Manager dialog box, select the Layout Templates **Loaded** check box, and click **OK**.

Creating a Layout From a Template

It is easy to put a layout together from a layout template. You can use one of the templates that come with MapInfo Professional, or you can use a template that you have created. To create a layout from a template:

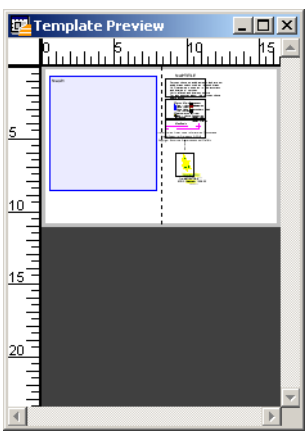
1. Open the windows you want to include in your layout.
2. To activate the Map menu, make a Map window the active window. If your layout contains more than one Map window, the frontmost Map window will be map 1 in the layout. You will be prompted for maps 2, 3, and 4.
3. Choose **Map > Create Layout From Template**. The Configure Layout dialog box displays on the screen. The Configure Layout dialog box enables you to specify the layout template to use, enter the map title text, if any, and specify settings that control how map 1 will look in the layout.



Note: The Template drop-down list will reflect any layout configuration changes you might have made prior to creating a layout. See **Configuring Layout Templates on page 47**.

4. In the **Template** drop-down list, select the layout template you want to use. The default template is the first template in the list. You set the default template when you configure a layout template. See **Setting the Default Template on page 52**.

5. Click the **View Template** button to open the selected layout template in a Layout window. For example, here is the Template Preview of a user-defined layout template: s that comes with MapInfo Professional: Standard Map (A4 Landscape).



Viewing the template is an optional step, but looking at the template can help to remind you of what elements are in a particular layout template. If you change your layout template selection, you must click the **View Templates** button again to see the new layout template selection.

6. If the layout template you selected has a Map Title text placeholder, enter the map title text in the **Map Title** box. This text will appear where the Map Title text placeholder is in the layout template.

7. In the **Map Scale** drop-down list, select the map scale. You can choose from a number of different scale settings:

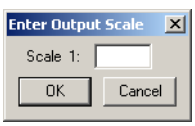
   - Same zoom width as on map–The map will display in the layout at the same scale setting that it does in the Map window. This is the default setting.
   - 1: 1000–One inch is equal to 1000 miles (or the distance units you have specified in the Map Options dialog box).

- 1: 2500–One inch is equal to 2500 miles (or the distance units you have specified in the Map Options dialog box).
- 1: 5000–One inch is equal to 5000 miles (or the distance units you have specified in the Map Options dialog box).
- 1: 10000–One inch is equal to 10000 miles (or the distance units you have specified in the Map Options dialog box).
- 1: 25000–One inch is equal to 25000 miles (or the distance units you have specified in the Map Options dialog box).
- 1: 50000–One inch is equal to 50000 miles (or the distance units you have specified in the Map Options dialog box).
- 1: 100000–One inch is equal to 100000 miles (or the distance units you have specified in the Map Options dialog box).
- User Defined Scale–The map in the layout will display at the scale setting you specify. When you select **User Defined Scale**, you will be prompted for a scale setting after you click **Next** in the Configure Layout dialog box.

8. In the **Zoom Layers** drop-down list, select the zoom layering you want in the layout. Choose one of the following zoom layering settings:
   - Maintain Zoom Layering Settings–The map displays in the layout using the zoom layering settings of the layers in the Map window.
   - Show Layers Currently Visible–The map displays in the layout showing the layers that are visible in the Map window.
   - Turn all zoom layering off–The map displays in the layout using no zoom layering for any layer, regardless of the zoom layering settings of the layers in the Map window.
9. If you want selected objects in the Map window to be highlighted in the layout, select the **Highlight Current Selection on Layout** check box. The highlighting is formed by objects drawn in the Cosmetic layer of the Map window.
10. Click **Next**. MapInfo Professional creates a copy of the frontmost Map window and displays this copy in the Layout window. Using a copy enables MapInfo Professional to manipulate the map that appears in the layout without affecting the map in the Map window.

    If you chose a standard scale setting and have only one Map window frame in your layout template, you are finished. You can make final adjustments to your layout and then print it or save it to a file.

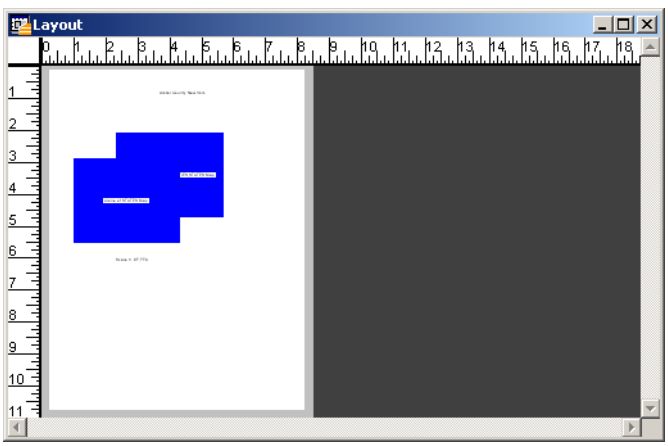
    If you elected to use your own scale setting or have more than one map in your layout template, go to **step 11**.
11. If you selected the **User Defined Scale** option in **step 7**, the Enter Output Scale dialog box displays on the screen. Enter the desired scale and click **OK**.



12. If you have more than one Map window frame in the layout template, the Select Mappers dialog box displays on the screen.

13. Three **Map** drop-down lists enable you to select up to three additional Map windows to include in the layout. You can have a maximum of four Map windows in a layout template.The number of **Map** drop-down lists that are available corresponds to the number of Map window frames in the layout template. In the Select Mappers dialog box shown here, one additional map is needed to complete the layout. The Map windows available to choose from correspond to the Map windows you have open.

    Select the additional map or maps needed to complete your layout and click **OK**. The layout displays on the screen.



Mapping – New Features and Enhancements

This section contains the new and enhanced Mapping features in MapInfo Professional 9.0.

- Setting a Global Label Font on page 56
- Creating Multiple HotLinks in a Map on page 56
- Setting the New Default Layout Preferences on page 60
- New Prompt Prevents the Loss of Work when Closing Windows on page 61
- Improvements in Symbol Style Dialog Box and New Fonts on page 62

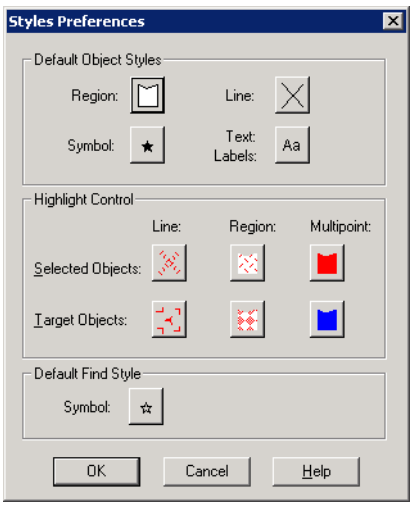
Setting a Global Label Font

Some of our customers have requested the ability to set the label preferences up front to make all of the maps they create look more uniform.

We have added this Label preference to the Styles Preferences dialog box for your convenience.

To set your global label font:

1. Choose **Options > Preferences > Styles** to display the Styles Preferences dialog box.



2. Click the **Text** button to display the Text Style dialog box. The options you select in this dialog box now also apply to labels.
3. Click **OK** to save your label preference.

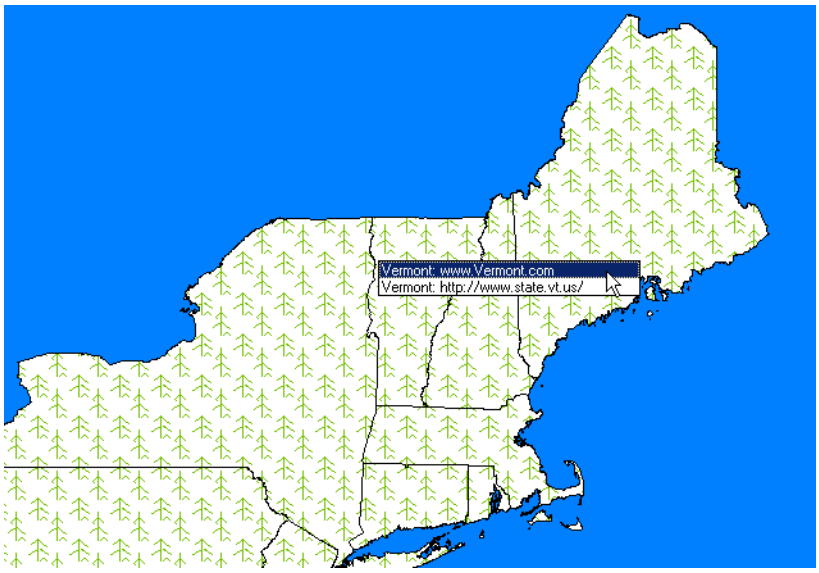
Creating Multiple HotLinks in a Map

Many users have asked us to allow more than one HotLink definition per map object. When a user clicks a map object with multiple HotLinks, a list of options are displayed, which allows your user to access different types of content for a single map object.

For example:

- Your Web site
- Product or Service Documents
- Applications
- Flash Demonstrations
- Anything you can open with a mouse click or double-click

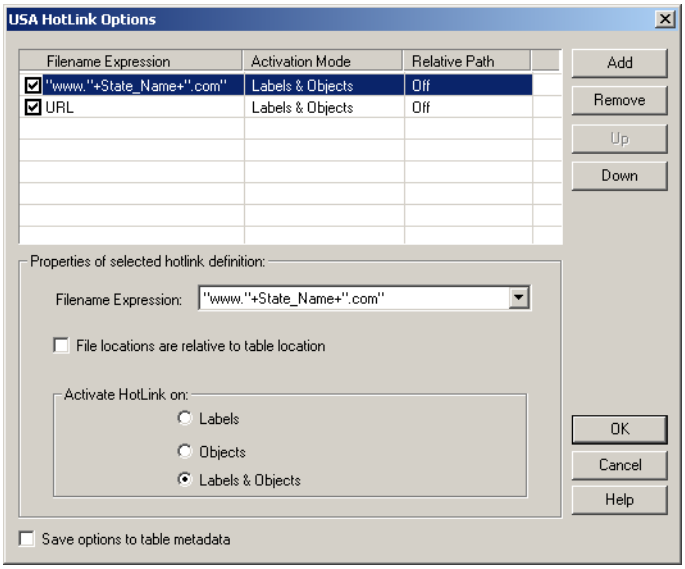
For example, you could offer your customers access to your web site, product information, and a tutorial all from the same map object.



Adding More than One Hotlink

To create more than one hotlink for a layer:

1. With the Map window open, select to display the Layer Control dialog box.
2. Click the layer you want to add the hotlink to and click **HotLink**. The HotLink Options dialog box displays.



The first time you open this dialog box, may be no column entries to display.

Note: The check box beside the **Filename Expression** indicates that the HotLink is active. To disable the HotLink, clear the check box beside the Filename Expression.

3. To edit a HotLink definition, select the definition in the list and use the fields and buttons in the **Properties of selected hotlink definition** section to set the values.

   Note: To edit a HotLink option, make another selection in this dialog box and click **OK**.

   Filename Expression
   Use this drop-down list to select a field in the selected layer's table. You can also select the **Expression** option to create an expression. We have created an example expression in the first column

   This option defaults to the first field in the table.

   File locations are relative to table location
   Use this check box to indicate whether the HotLink data you are specifying is in the relative path of the open .tab file. This check box is cleared by default.

   Activate HotLink on
   Use these buttons to indicate which map feature the user can click to activate a HotLink. Options include **Labels**, **Objects**, or **Labels & Objects**. The **Labels** option is selected by default.

   Note: When you select the same activation option for two different Filename Expressions, a list of options displays for the user.

   Save options to table metadata
   Use this option to save the HotLink options you select in this dialog box to the metadata of the .tab file. This option is cleared by default.

Accessing Multiple HotLinks

To access these multiple HotLinks:

1. Open the map.
2. Select from the Main toolbar menu.
3. Click an area on the map with multiple HotLinks to see the list.

Removing a HotLink from a Map

There are two ways to remove a HotLink from a map. The Map window that contains the HotLinks you want to remove must be open to remove the HotLinks.

To remove a HotLink from a map permanently:

1. Choose to display the Layer Control dialog box.
2. Select the layer that contains the HotLink you want to remove permanently.
3. Click **HotLink** to display the HotLink Options dialog box.

4. Highlight the HotLink you want to remove.
5. Click **Remove**. There is no confirmation prompt for this action.
6. Click **OK** to save this change.

To disable a HotLink temporarily:

1. Follow **step 1**through **step 3** in the previous instructions to display the HotLink Options dialog box.
2. Clear the check box beside the **Filename Expression** column of the HotLink you want to disable.
3. Click **OK** to save this change.

Changing the Display Order of HotLinks in a List

If you have multiple HotLinks for a particular map feature, you may want to prioritize the order in which the HotLinks display.

To reorder the list of HotLink entries for a particular layer:

1. Choose to display the Layer Control dialog box.
2. Select the layer that contains the HotLink you want to remove permanently.
3. Click **HotLink** to display the HotLink Options dialog box.
4. Highlight the HotLink you want to move and use the **Up** and **Down** buttons to position the HotLink in the proper order.
5. Click **OK** to save this change.

Multiple HotLink Notes

The following multiple HotLink behavior may not be obvious:

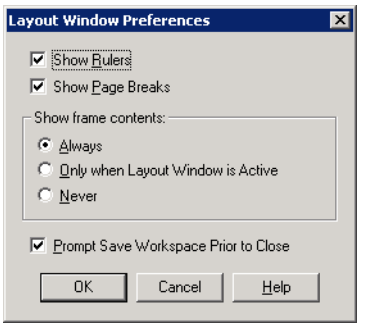
- If a HotLink definition has a Filename Expression value of none (that is, it is an empty string) the Hotlink Options dialog box displays the Filename Expression as <undefined>.
- When you hover the cursor over a map feature that contains a HotLink, MapInfo Professional displays a message in the Status bar describing the content of the HotLink. When there is more than one HotLink for that map feature or the activation attributes overlap, the phrase, **Multiple active objects under cursor** is displayed in the Status bar.

Setting the New Default Layout Preferences

We have added Layout preferences so you can set the options for Layout windows globally by default. You can change these options locally to meet the individual needs of your current Layout, but global preferences can assist you in presenting a unified look in your presentation map graphics.

To set the global default preferences for Layout windows:

1. Choose **Options > Preferences > Layout Window** to display the Layout Window Preferences dialog box.



Use this dialog box to set the preferences for Layout windows. Completing the entries in this dialog box ensures that your layouts will have a uniform look and feel.

2. Complete the selections in this dialog box and click OK to save your Layout window preferences.

Show Rulers

Select this check box to display rulers in your Layout window. Rulers can be useful to help you line up elements of your layout on the page. This option is selected by default.

Show Page Breaks

Select this check box to display the page breaks in your Layout window. Showing the page breaks ensures that the elements of your layout are consistent from page to page. This option is selected by default.

Show Frame Contents

The options in the Show frame contents box allow you to specify when the contents of frames display.

Always

Allows you to have the contents of a frame display all the time even when it is not active.

For example, if you are changing the contents of a Map window that is also in the layout, you might want the **Always** option. That way you can see the effect of the layout as you make your changes. This option is selected by default.

Only when Layout window is active

Allows you to display the contents of a frame only when the Layout is the active window.

Never

Allows you to display only the file name and frame type, even when the Layout is the active window. For example, choose **Never** when you are resizing and repositioning frames. That way the contents of each frame will not redraw every time you make a change.

Prompt to Save Workspace Prior to Close

When this check box is selected, MapInfo Professional prompts you to save before you close windows with layout changes. Clear this check box if you do not want to be prompted to save your changes. This option is selected by default to prevent accidental loss of information.

Note: The prompt only displays if there are changes to the open Layout and Legend windows or when the Layout and Legend windows are new.

3. Click **OK** to save your preference.

Once you set these preferences, MapInfo Professional sets these options automatically whenever you create a new Layout window. To reset these options for a particular layer locally, select **Layout > Options** to display the Layout Display Options dialog box. This dialog box also allows you to set height and width restrictions and an autoscroll option.

New Prompt Prevents the Loss of Work when Closing Windows

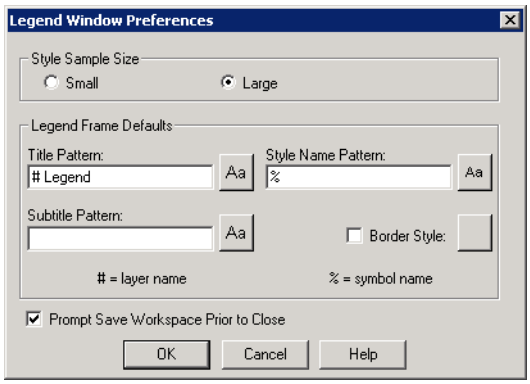
Some have you have raised issues about losing work when closing windows. When you use the Close All option, MapInfo Professional closes not only the window you are working in but also Layout and Legend windows that are open as well. When you close a Map window, MapInfo Professional closes the Legend and Layout windows associated with that map too.

Note: The instructions for setting this prompt for Layout windows are described in**Setting the New Default Layout Preferences on page 60** topic.

To prevent the loss of work, we have added a new prompt option to the Layout Window Preferences and the Legend Window Preferences dialog boxes. This prompt allows you to choose to save the contents of the windows you are working in to a workspace before closing. You can also choose to discard these changes.

To set the new prompt when you close Map windows with open Legend windows:

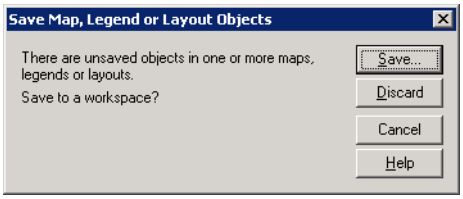
1. Choose **Options > Preferences > Legend Window** to display the Legend Window Preferences dialog box.



2. Select the **Prompt Save Workspaces Prior to Close** check box to display the prompt when closing all or closing map windows.
3. Click **OK** to save your Legend window preferences.

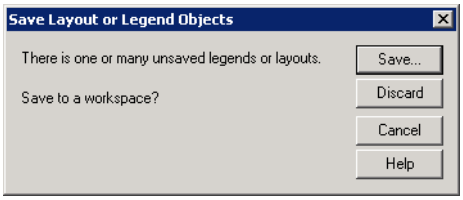
Using the New Save Workspace Prompt

Once you have set these preferences and click the button on the Standard tool bar or you select **File > Close All** while you are in a Layout or Legend window, this prompt displays:



Here you can choose to save your current work or discard it. Click **Save** to save all of the work you have completed in all your open windows or **Discard** to lose all of the changes you have made since the last save.

When close a Map window that has layouts and legends associated with it, this prompt displays:



The same rules apply here. Click **Save** to save all of the work you have completed in all your open windows or **Discard** to lose all of the changes you have made since the last save. The prompt only displays if there are changes to the open Layout and Legend windows or these windows are new.

Improvements in Symbol Style Dialog Box and New Fonts

We have improved the Symbol Style dialog box by increasing the width of the Font drop-down list and by adding new Emergency Response fonts.

Many users have indicated that the font names have been difficult to distinguish because the width of the Font drop-down list is too narrow.

We have added new standard fonts prepared by the Office of Homeland Security for use in your MapInfo maps. These fonts were developed to standardize the way emergency circumstances and industries are depicted in maps. These TrueType fonts are listed using the format “ERS V# symbol type” for clarity. Specifically the new symbols are:

- **ERS v2 Damage** - Use these fonts to create your own symbols. These fonts include circles, squares, and rectangles of various complexity.
- **ERS v2 Incidents** - Use these fonts to show various hazardous circumstances such as fires, police activity, and other dangers.
- **ERS v2 Infrastructures Stage 01 - 04** - Use these fonts to show various industrial environments including farms, factories, financial businesses etc. in a wide variety of complex frames to indicate severity

- **ERS v2 Natural Events** - Use these fonts to show areas of natural disasters such as hurricanes, tsunamis, volcanoes and other natural events
- **ERS v2 Operations Stage 01 - 04** - Use these fonts to show various emergency circumstance symbols such as ambulances, biohazard, and Red Cross-type symbols in a wide variety of complex frames to indicate severity

Tool Enhancement

Setting the Window Size with the Window Manager Tool

You can now resize the open browser, map, layout, and graph windows in MapInfo Professional using the Window Manager tool. Remember you need to add the Window Manager tool to the Tool Manager list before using it. For specific instructions in using this new feature, see the *Windows Manager Tool* in the *Help System*.

Coordinate System and Datum Enhancements

For the details of these projections, see the Custom Datums section in the Appendices.

Added Bosnia-Herzegovina Coordinate Systems. We have added the following projections to the PRJ file:

- Bosnia-Herzegovina (Zone 5)
- Bosnia-Herzegovina (Zone 6)
- Bosnia-Herzegovina (Zone 7)

Added Luxembourg Projections. We have added the following Luxembourg projection to the PRJ file:

- Luxembourg 1930 / Gauss\p2169

Added S-JTSK (KROVAK) Coordinate System. We have added a new S-JTSK projection to the .PRJ file to serve the Czech Republic and Slovakia. We have added using new Projection #32 and new Datum #1020:

The last PRJ entry is using following parameters:

Datum:1020 (S-JTSK datum with Ferro Prime meridian)

Units:- meters

Origin, Longitude: 42.5 degree (East of Ferro)

Origin, Latitude: 49.5 degree

Standard Parallel: 78.5 degree

Azimuth: 30.28813972 degree

Added Swedish Coordinate System. We have added the following projection to the PRJ file.

- ST 74

Updated EPSG Aliases for Swedish Coordinate Systems. We have added two new EPSG aliases for Swedish coordinate systems to the PRJ file to maintain consistency with the latest update to MapXtreme:

- EPSG:2326
- EPSG:3152

Updated Hong Kong EPSG Code. We have added the following EPSG code entry to the PRJ file:

- Hong Kong 1980 Grid System\p2326

Updated Australian Victorian Coordinate System

We have added the following Australian bounded projections to the PRJ file:

- VIC VicGrid66 (AGD 66)
- VIC VicGrid94 (GDA 94)
- VIC AMG Zone 54 (AGD 66)
- VIC AMG Zone 55 (AGD 66)
- VIC MGA Zone 54 (GDA 94)
- VIC MGA Zone 55 (GDA 94)
- VIC Longitude/Latitude (AGD 66)
- VIC Longitude/Latitude (GDA 94)

Updated Danish Coordinate System Entries

We have added the following Danish projections to the PRJ file

- UTM Zone 32 Euref89\p25832
- UTM Zone 33 Euref89\p25833
- UTM Zone 32 (ED 50)\p23032
- UTM Zone 33 (ED 50)\p23033
- System 34 Jylland-Fyn\p34003
- System 34 Sjaelland\p34005
- System 45 Bornholm\p45001
- KP2000 Jylland-Fyn\p18401
- KP2000 Sjaelland\p18402
- KP2000 Bornholm\p18403

Printing, Importing, and Exporting Enhancements

Exporting to GeoTIFF (*.tif) Format

MapInfo Professional includes the capability of exporting Map windows to GeoTIFF (*.tif) export format. GeoTIFF files are designed to connect a raster image to its location on the earth. Georeferencing information is written directly to the *.tif file so that it can be used in other applications.

GeoTIFF Export Requirements

This section explains the requirements for exporting maps to GeoTIFF format. Using GeoTIFF format has the following requirements:

- The window you are exporting is a Map window.
- The Map window's projection contains an EPSG code. Projections that do not have an EPSG code are not supported.
- The Map window must not be rotated, or contain a raster image that causes a rotation.

The sections that follow explain the requirements in more detail.

Map Windows

When you export a Map window to GeoTIFF format, the file is saved in the current projection of the Map window.

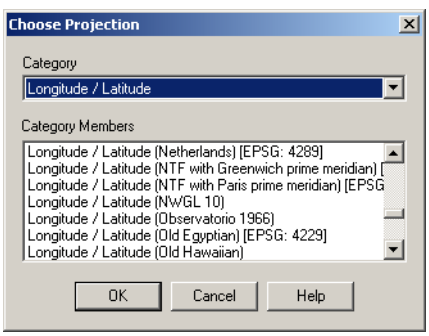
You cannot use the Save Window As command to save the Map window to a different projection. To use a different projection, you must change the Map window projection before you use the Save Window As command.

GeoTIFF is not available as an export format for other types of windows (Browser, Graph, Legend, Redistricter, 3DMap) or Map windows that use unsupported projections.

Supported Projections

For GeoTIFF export the Map window projection must have an EPSG code.

You can see whether a projection has an EPSG code in the Choose Projection dialog box.


Choose Projection
Category
Longitude / Latitude
Category Members
Longitude / Latitude (Netherlands) [EPSG: 4289]
Longitude / Latitude (NTF with Greenwich prime meridian) [
Longitude / Latitude (NTF with Paris prime meridian) [EPSG
Longitude / Latitude (NWGL 10)
Longitude / Latitude (Observatorio 1966)
Longitude / Latitude (Old Egyptian) [EPSG: 4229]
Longitude / Latitude (Old Hawaiian)
OK
Cancel
Help

The Choose Projection dialog box is available from the Map Options dialog box. With a Map window open, choose Map > Options. In the Map Options dialog box, click the Projection button.

The MAPINFOW.PRJ file entries that use EPSG codes contain a "\P###" code. For more information see the MapInfo Professional User Guide, Chapter 14: Working with Coordinate Systems and Projections.

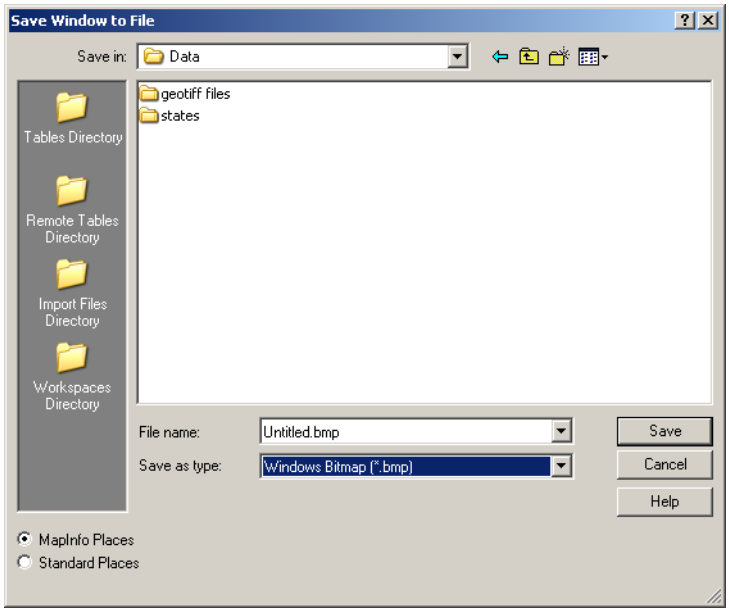
Image Rotation

In Map windows that contain a raster or grid image, the image must not cause the map projection to rotate the coordinates if you wish to create a GeoTIFF for this Map window. Rotation can occur if the image is not registered precisely. To work around this, you can force Image Reprojection to be enabled by setting Map > Options > Image Processing > Reprojection Using > Always. If Image Processing is set to Always, then it is possible to use raster layers for GeoTIFF export

GeoTIFF Export Procedure

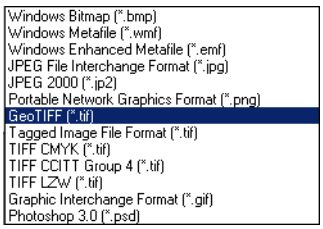
To export a Map window to a GeoTIFF format file, do the following:

1. Open the desired layers in a Map window, if you do not have your map open already.
2. Make the Map window active.
3. Choose **File > Save Window As**. The Save Window As dialog box displays on the screen.



4. In the **Save in** box, select the destination folder of the exported file.

5. In the **Save as type** drop-down list, click the arrow to see the file format choices. Select GeoTIFF (*.tif).



6. In the **File name** box, enter a name for the exported file.

Click **Save** and continue with the normal Save Window As process.

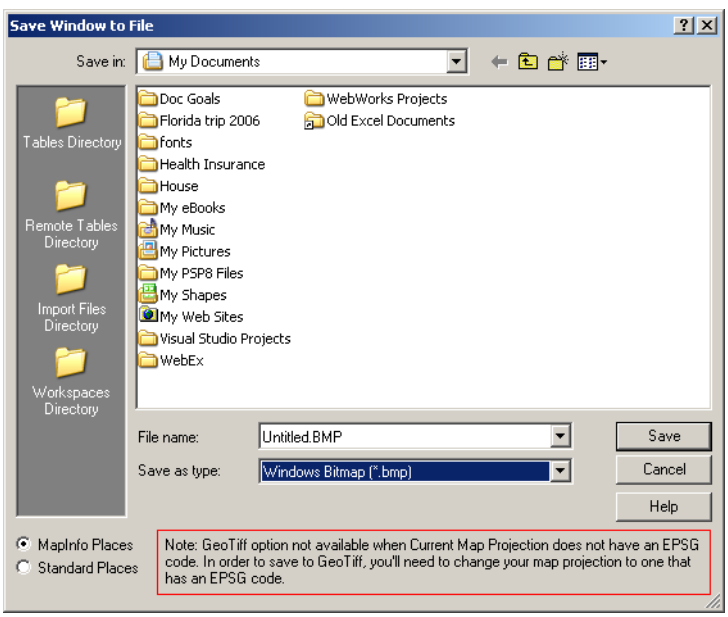
Other Types of Windows

If you attempt to export other types of windows to GeoTIFF format (for example, Browser, Graph, Legend, Redistricter, 3DMap), the GeoTIFF format will not be available as an export format in the Save as type drop-down list.

Unsupported Projections

If you attempt to export a Map window using a projection that is not supported by the GeoTIFF format, that is, a projection that does not have an EPSG code, the GeoTIFF format will not be available as an export format. In addition, the Save Window As dialog box displays the following message at the bottom of the dialog box:

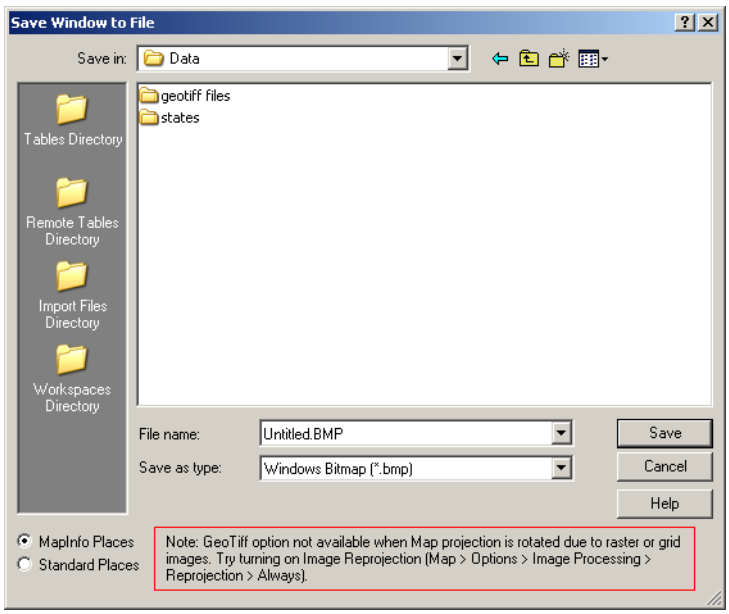
Note: GeoTIFF option not available when Current Map Projection does not have an EPSG code. In order to save to GeoTIFF, you'll need to change your map projection to one that has an EPSG code.



Raster and Grid Images

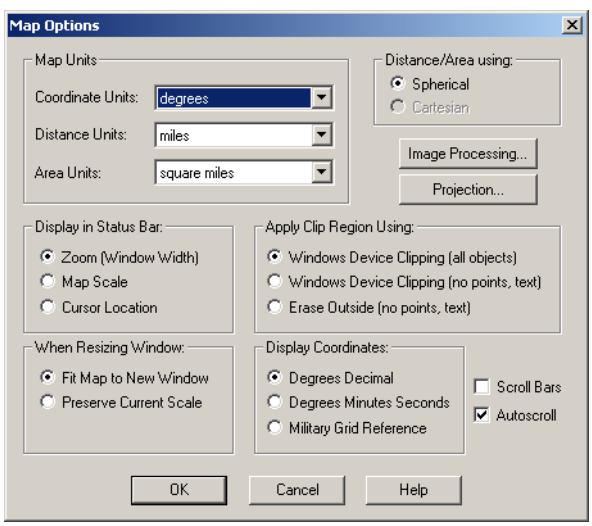
If you attempt to export a Map window that contains a raster or grid image that causes a rotation in the Map window, the GeoTIFF format will not be available as an export format. In addition, the Save Window As dialog box displays the following message at the bottom of the dialog box:

Note: GeoTIFF option not available when Map projection is rotated due to raster or grid images. Try turning on Image Reprojection (**Map > Options > Image Processing > Reprojection > Always**).

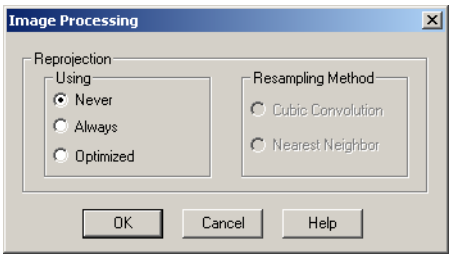


To turn on Image Processing, do the following:

1. Choose **Map > Options**. The Map Options dialog box displays on the screen.



2. Click **Image Processing**. The Image Processing dialog box displays on the screen.



3. Click **Always**, and then click **OK**.
4. Click **OK** in the Map Options dialog box.
5. Try saving the Map window to GeoTIFF format again.

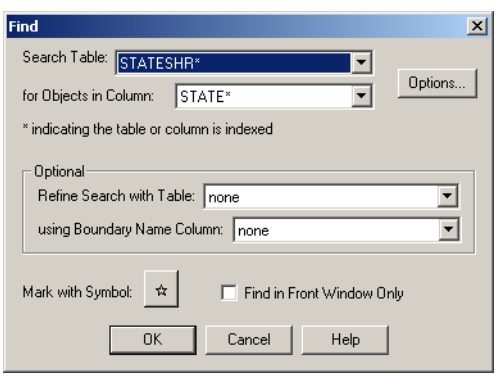
Database Enhancements

The following are the database enhancements for this version of MapInfo Professional:

- **Using the Find Command in Remote Tables on page 69**
- **Using the Geocode Command in Remote Tables on page 70**
- **New Find Selection Preferences for Copying/Pasting on page 70**
- **New Time and DateTime Data Type Support for Remote Databases on page 72**

Using the Find Command in Remote Tables

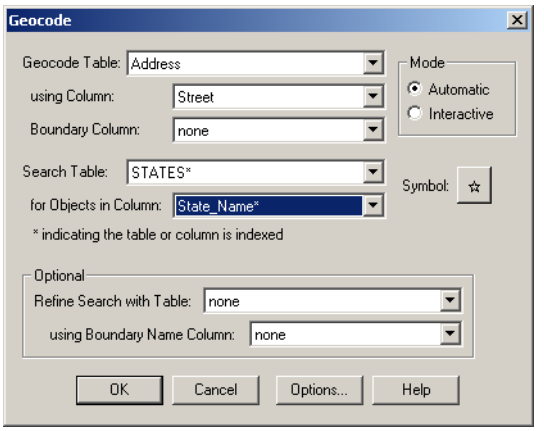
The Find command (**Query > Find**) is available for both live and linked remote tables, regardless of whether they are indexed. Neither the table nor a column in the table needs to be indexed for the Find command to be available.



If the selected column in the search table does not have an index, an index will be created when you click **OK** in the Find dialog. For native tables and linked remote tables, this newly created index is permanent. For live remote tables and read-only native tables, the index is temporary.

Using the Geocode Command in Remote Tables

The Geocode command (**Table > Geocode**) is available for both live and linked remote tables, regardless of whether they are indexed. Neither the table nor a column in the table needs to be indexed for the Geocode command to be available.



If the selected column in the search table does not have an index, an index will be created when you click **OK** in the Geocode dialog. For native tables and linked remote tables, this newly created index is permanent. For live remote tables and read-only native tables, the index is temporary.

Additional Notes

The Find and Geocode dialog boxes both contain the following design elements:

- Indexed tables and columns are shown with an asterisk at the end of their names in the **Search Table** and **for Objects in Column** drop-down lists. There is a reminder in each dialog box about what the asterisk means.
- The tables in the **Search Table** drop-down list are listed in alphabetical order.
- The width of the list boxes adjusts dynamically to fit the longest table or column name.

New Find Selection Preferences for Copying/Pasting

In the last release of MapInfo Professional, we added zoom functionality when performing a Query > Find Selection on a single object. We added this feature so MapInfo Professional would perform consistently with existing Query > Find Selection behavior for multiple objects. In speaking with users subsequently, we found that most of you were using this functionality to copy and paste a single object, and since the object was already in view, the additional zoom was not necessary. In fact, if you were doing multiple copy and paste operations, the new functionality was a hardship.

Some customers objected to the Find Selection zoom functionality for multiple objects as well. Others wanted the option of zooming or not zooming in different situations, so we have created a Map window preference so you can set the functionality that works best for you.

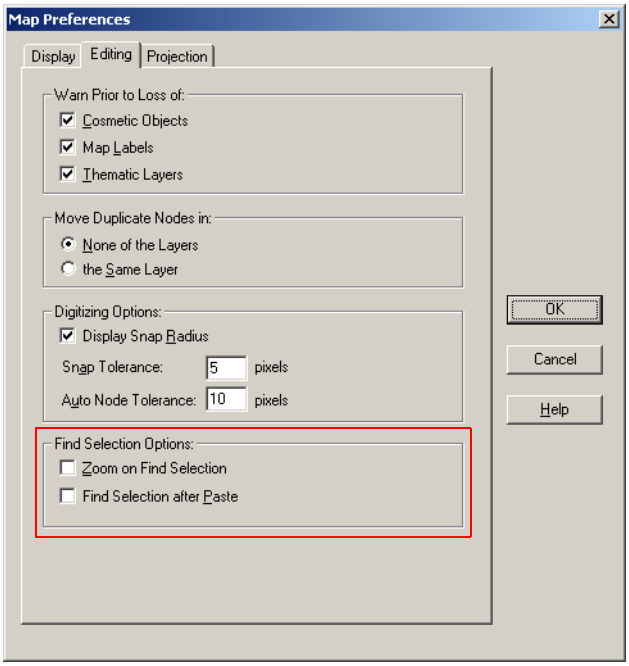
When we refer to Find Selection, we include all of these functions:

- Query > Select
- Query > SQL Select
- Query > Find Selection
- Copy/Paste

To make Map Preferences easier to work with, we have created a tab system.

To set your Find Selection options for Map windows:

1. Choose **Options > Preferences > Map Window > Editing** tab to display the Editing Map Preferences dialog box.



Use the Find Selection Options to specify the behavior when you are performing a Find Selection.

2. Select the **Zoom on Find Selection** option to zoom to the selection each time you perform a Find Selection for single and multiple objects. Clear this check box to prevent zooming when performing a Find Selection.
3. Select the **Find Selection after Paste** option to turn on the Find Selection feature in the Map window only after you Paste an object. If you have an active Browser, and the selection is in that Browser window, the browser still scrolls to the selection. Clear this check box to prevent zooming after pasting an object.
4. Click **OK** to save your preferences and **OK** again to return to the Map window.

New Time and DateTime Data Type Support for Remote Databases

The new Time and DateTime data types (see **Using Date- and Time-Based Data in Maps and Queries on page 23**) address a long time issue with many remote databases. Because MapInfo Professional only had a date data type, and most remote databases and servers have Date and DateTime data types, data read from servers would often be truncated or lost in the process.

With the addition of these new Time and DateTime data types, the server DATE, TIME, and DATETIME/TIMESTAMP match up with the MI Date, MI Time, and MI DateTime more closely. If you create a new table with DateTime or Time data in it, the .tab file (both live and linked) you create is marked as version 900 file.

To preserve backward compatibility, when you open an existing live .tab file (linked .tab files are really native tables with a local table definition), the behavior depends on the version of the .tab file. If the tab file is marked as version 900 or later, MapInfo Professional treats the server DATE as MI Date, the server DATETIME or TIMESTAMP as MI DateTime, and server TIME (if any) as MI Time. If the version number is earlier than 900, MapInfo Professional matches the behavior of previous releases, that is, the server DATE and DATETIME or TIMESTAMP values are converted to MI Date and server TIME to MI Char. In addition the Informix DATETIME type is opened as MI Date but is marked read-only. This is true of live tables only because linked tables have already been defined.

Handling Time and DateTime Data From Remote Databases

When you download Date, Time, and DateTime data type information to MapInfo Professional, this is the results you can expect:

MapInfo Professional Data Type	From Informix	From Oracle (OCI)	From MS Access	From MS SQL Server
DATE	DATE	DATE**		
TIME	DATETIME HOUR TO SECOND			
DATETIME	DATETIME YEAR TO FRACTION	TIMESTAMP*	DATETIME*	DATETIME*

*Backward compatibility depends upon the .tab file version as described above.

**If you use ODBC, the Oracle DATE type is returned as TIMESTAMP. The driver issue causes an inconsistency with OCI.

When you commit table data from MapInfo Professional to these remote database servers, MapInfo Professional updates the server table with the value that the user provides in the browser. MapInfo Professional may apply some restrictions during the input time.

Working with Time and DateTime Data on the Server

When you create a new table or save a copy of a table with Date, Time, and DateTime data type information on a DBMS server, this is the results you can expect:

In MapInfo Professional	To Informix	To Oracle	To MS Access	To MS SQL Server
DATE	DATE	DATE	DATETIME*	DATETIME*
TIME	DATETIME YEAR TO FRACTION(3)*	TIMESTAMP(3)*	DATETIME*	DATETIME*
DATETIME	DATETIME YEAR TO FRACTION(3)	TIMESTAMP(3)	DATETIME	DATETIME

*The MapInfo Professional data type will be extended on the servers. When the same data returns to MapInfo Professional it becomes the data type identified on the server. This mismatch is caused by a mismatch between the data types in the server and MapInfo Professional.

As you can see from the previous table, there may be conversion issues involved depending on the local type and the type of database server you are communicating with. To make the data type conversion clearer we have added some messages to inform you of the details of the conversion when you are creating a new table or saving a copy of a table data to a remote database. When you use the Create New Table or Save Copy of Table as dialog boxes, red messages display at the bottom of the dialog box to inform you of the Date, Time, and DateTime conversion details.

If you create a new table with Date, Time, and DateTime data using MapBasic statement, the notification is a little different. If you use the Server Create Table statement, keep in mind that the statement only supports the types that are also supported by the server. Therefore, Time type is prohibited from this statement for Oracle, IBM Informix, MS SQL Server and Access servers and the Date type is prohibited for MS SQL Server and Access servers. You should replace unsupported types with DateTime to create a table that contains Time information on a column.

If you create a copy using a MapBasic statement and the source table contains Time or Date type columns, these columns will be converted to DATETIME or TIMESTAMP depending on whether the server supports the data types or not and the parameters you pass in. You can control this behavior using the ConvertDateTime clause. If the source table does not contain Time or Date data type, this clause is not operational. If ConvertDateTime is set to ON (which is the default setting), Time or Date type columns will be converted to DATETIME or TIMESTAMP. If ConvertDateTime is set to OFF the conversion is not done and the operation will be cancelled if necessary. If ConvertDateTime is set to INTERACTIVE a dialog box will pop up to prompt the user and the operation will depend on the user's choice. If the user chooses to convert, then the operation will convert and continue; if the user chooses to cancel, the operation will be cancelled. The Time type requires conversion for all supported servers (Oracle, IBM Informix, MS SQL Server and Access) and the Date type requires conversion for MS SQL Server and Access database servers.

Note: For MS SQL Server and Access database servers, this restriction could be an backward compatibility issue. In previous releases, we did the conversion without explaining it. In this release, we suggest you use the DateTime data type instead of Date data type. If you still use the Date data type, the conversion operation will fail.

Miscellaneous Enhancements

The following changes are additional significant enhancements to the MapInfo Professional product:

- New Time and DateTime Data Type Support for Remote Databases on page 72
- Envinsa Routing and Geocoding Constraints Change on page 74
- New TrueType Font Behavior on page 74
- Improved Character Set Conversion on page 74
- MapBasic Help Available from MapBasic Window on page 75

Envinsa Routing and Geocoding Constraints Change

We have changed the way we limit the amount of information that is sent to servers based on upgrades to the Envinsa product. For example, you may notice that the **Add** button in the Create Driving Regions dialog box or the Geocode using Server dialog box is disabled if you have reached the limit on the number of request values (number of address batches, times, or distances) you have sent to the server. In the past, MapInfo Professional used to use the same limit for all servers but we found that the loads a server can handle vary widely. Newer versions of Envinsa allow the server to set limits on the server side, and MapInfo Professional will now use these limits. You may see some changes in behavior when you switch servers and the new server has different limits.

Another difference you may see is that a particular quantity of address batches, times or distances may work for one server but not for another.

These changes should improve the performance of your connection to the server in that MapInfo Professional is not sending more information to the server than it can handle.

New TrueType Font Behavior

Curved labels and other text display features are moving MapInfo Professional toward using only TrueType fonts. For all text display excluding curved and rotated labels, MapInfo Professional 9.0 will honor the use of non-TrueType fonts, but we recommend the use of TrueType fonts wherever possible.

When you use the Text Style dialog box, you may notice that only TrueType fonts display in the Font list by default. If you have used a non-TrueType font in an old workspace or table, this font appears in the Font list. If you use a non-TrueType font in an existing workspace or .tab file and begin using the curved labels feature, MapInfo Professional substitutes the font you are using with a TrueType font.

Improved Character Set Conversion

For many years, MapInfo Professional has supported the automatic conversion of characters from one character set (called a codepage in Windows) to another. Even though our internal code API allows for conversions from any two character sets, in all cases the conversion occurs between a character set associated with some data (a text file in MapBasic or a table) and the system character set, which is an internal value based on a Windows setting.

If characters in your data display incorrectly or display as an _ (underscore), your character set conversion routine or tables may be to blame.

We have found that these Microsoft Windows conversion tables and routines more adequately meet our customers' needs. Therefore, MapInfo Professional now relies on the character set conversion routines supplied by the Windows operating system. Most modern systems have all these internal tables already configured. If a situation occurs where those tables are not installed, you can easily install them, if you have administrative rights.

See **http://www.microsoft.com/resources/documentation/windows/xp/all/proddocs/en-us/int_pr_install_code_page.mspx?mfr=true** for details.

MapBasic Help Available from MapBasic Window

If you use the MapBasic Window, you may be interested in looking up information about the functions and statements that you see there. There is a MapBasic section in the *Help System* that shows the purpose, syntax and examples of all MapBasic Language features.

To access the MapBasic Language reference features available in the MapBasic window:

- Do one of the following:
  - Select **Help > MapInfo Professional Help Topics**. When you select this option, you can access the MapBasic Language Reference list of functions, statements, and clauses you can use in the MapBasic window.

Figure: MapBasic Language Reference Help Topic

*When you find a function or statement you think is particularly useful, you can save it to the **Favorites** tab for later reference.*

- Open the MapBasic window and select **F1**. The MapBasic Window topic displays:

From this help topic you can access the Language Reference or learn more about working in the MapBasic window.

Data Enhancements

To provide more room for data in the future, we have decided to ship a separate data CD with MapInfo Professional.

Here is the directory structure and data presentation for the introductory and sample data that is shipped with MapInfo Professional. We use the term Introductory Data to describe the data you can use to geocode locally and to enhance the maps you create in every session. The Sample Data folder provides examples of other types of data that are available from MapInfo Corporation.

The Introductory_Data directory is structured as follows:

- NorthAmerica
- USA
- Canada
- Mexico
- World
- [files]
- Europe
- Asia
- Africa
- Australia
- World_WMS
- workspcs

The Sample Data is designed to give you a taste of the other kinds of data products you have available to you. The SampleData directory is structured as follows:

- Geographic
  - AirPhotoUSA
  - StreetPro Samples
- Industry_Data
  - Business Points
  - Insurance
  - TelcoData
  - Weather

We have added more industry-specific sample workspaces and updated the samples that ship with the MapInfo Professional application to enhance your maps and geocoding. To make space for this new data, we have removed the indexes from all of the data except the USZIPBDY.TAB, US_ZIPS.TAB, and the US_CNTY.TAB files. You need the indexes for these files to maximize your ability to geocode to ZIP code boundaries and centroids and county centroids.

Installing the Free Data Locally

To install the free data locally:

- Place the Data CD in the CD drive and follow the prompts that display according to the needs of your implementation of MapInfo Professional.

CAUTION: **If you want to install this data in addition to your existing product data, you need to specify a new directory to ensure that your current data is maintained.**

Data Updates and Additions

The data updates and additions for this release include:

- Updated ZIP Code Point file to version April, 2007
- Updated ZIP Code Boundary file to version October 2005
- Added new version of telephone company data for Connecticut April, 2007 (Area Codes, PSAP, RateCenters)
- Added Updated RiskInfo (Weather) data for Connecticut September, 2005
- Added Business Points sample data for Connecticut in workspaces, showing potential use cases – January, 2006
- Added a sample of IDSS (Insurance Decision Solution Suite)
- Updated all StreetPro sample data – StreetPro US Version 10.0 January 2007
- Added StreetPro samples for Austria, Denmark, France, Ireland, Norway, Portugal, and Switzerland
- Added sample crime data in the UKCrimeExample directory
- Crater_3d.wor and ElevationUS_3D.wor provide is a new 3D grid workspaces
- CurvedLabel.wor displays the new Curved Label feature

3

Installing and Configuring MapInfo Professional

This chapter helps you install and set the basic preferences for MapInfo Professional®. In addition, there are instructions for fixing problems that come up as part of the installation process. We also cover starting and exiting the product.

Sections in this Chapter:

- System Requirements 80
- MapInfo Professional and Operating System Support 81
- MapInfo Professional Database Connectivity and Support 83
- Before You Install MapInfo Professional 84
- Installing MapInfo Professional 85
- MapInfo Licensing and Activation 92
- Modifying or Removing MapInfo Professional 112
- Configuring the MapInfo Professional Preferences 116
- Starting up and Leaving MapInfo Professional 149
- File Format Types Supported 150

System Requirements

Below are the guidelines for minimum and recommended system requirements. Please note that hardware requirements do vary based on your use of the product and your system. In general, a higher processor speed, larger memory (RAM) and industry leading graphics cards provide a better user experience and result in better responses from MapInfo Professional. These are the minimum system requirements for MapInfo Professional 9.0:

Operating Systems	Minimum Memory	Minimum Disk Space	Minimum Graphics	Minimum Monitor
Windows 2000 Professional SP 4 Windows Vista *	128 MB of RAM with a minimum of a Pentium PC	Application 103 MB Data 450 MB	16- or 24-bit Color	800x600 Display
Windows XP Professional SP 2 Windows XP Home SP 2 Windows 2000 Server SP4 Windows 2003 Server SP 1 with Terminal Services/ Citrix	64 MB of RAM with a minimum of a Pentium PC	Application 103 MB Data 450 MB	16- or 24-bit Color	800x600 Display

* MapInfo Professional is not currently Windows Vista certified.

These are the recommended system requirements for MapInfo Professional 9.0:

Operating Systems	Recommended Memory	Recommended Disk Space	Recommended Graphics	Recommended Monitor
Windows 2000 Professional SP 4 Windows XP Professional SP2 Windows XP Home SP2	256/512 MB of RAM with a minimum of a Pentium PC or better	Fast EIDE 2 or SCSI Interface with 2GB or better Data 450 MB	Mid to High 2D/3D card with 128MB or better	Greater than 1024x768 resolution or better
Windows 2000 Server SP4 Windows 2003 Server SP 1 with Terminal Services/Citrix	Same, PLUS memory sufficient to support each connected user	Fast EIDE 2 or SCSI Interface with 2GB or better Data 450 MB	*Server*: Same *Client*: Choose based on resolution/speed requirements	Greater than 1024x768 resolution or better

Note: **For Windows 2003 Server Users**: Keep in mind that some of the options you choose for the server can limit the options available to the client system.

MapInfo has exhaustively tested MapInfo Professional under the following Microsoft Windows Desktop Operating Systems:

- Windows 2000 Professional
- Window XP Home Edition
- Windows XP Professional

MapInfo has exhaustively tested MapInfo Professional under the following Microsoft Windows Server Operating Systems:

- Windows 2003 Server
- Windows 2003 with Terminal Services with Citrix Meta Frame technology. To learn more about this installation option see **Windows 2003 Server with Terminal Services/Citrix Support in Chapter 3 on page 82**.

MapInfo has performed Installation and validation testing on the following 64Bit Windows Operating System:

- Microsoft's 64-bit Windows XP Professional with 32 Bit compatibility mode.

Note: There are no special installation instructions for installing MapInfo Professional on a 64-bit Windows Operating System. Please follow the instructions designed for your installation type (**Typical Workstation Installation on page 88**,**Custom Workstation Installation on page 88** or **Network Installation on page 90**) presented in this chapter.

MapInfo Professional and Operating System Support

This section provides additional detail on the operating system support for MapInfo Professional, including:

- **Windows 2000 Support on page 81**
- **Windows 2003 Server with Terminal Services/Citrix Support on page 82**

Windows 2000 Support

MapInfo Professional supports Windows 2000 (SP 4) features as described in the Application Specification for Microsoft Windows 2000 document (available at http://www.microsoft.com/WINDOWS2000/news/bulletins/appspec.asp).

The key aspects of Windows 2000 support with regard to MapInfo Professional are:

- Supporting multiple users on a single machine, each having their own application settings.
- Supporting use of MapInfo Professional on a secure Windows 2000 computer (one where users have very limited access rights).
- Using an installer based on the Windows Installer Service.

In order to support these requirements, we have changed the location of many application data files (for example, files containing information used by MapInfo Professional during execution (for example, the projection file, mapinfow.prj). The installer places the files under the current user's Application Data folder. Likewise, some registry entries have been moved from HKEY_LOCAL_MACHINE to locations under HKEY_CURRENT_USER. In both cases the current

user is guaranteed to have write access to the folder or registry key. Also, since the files and registry entries are stored in user specific locations, each user of the computer has their own application data files (e.g. each has their own copy of the preference file, mapinfow.prf).

Note: The changes described above apply to all versions of Windows supported by MapInfo Professional. The exact location of the Application Data folder varies depending on the version of Windows:

OS	Application Data Folder Location
Windows 2000 (SP 4)	c:\Documents and Settings<user name>\Application Data
Windows XP Professional (SP 2)	c:\Documents and Settings<user name>\Application Data
Windows XP Home (SP 2)	c:\Documents and Settings<user name>\Application Data

Windows 2003 Server with Terminal Services/Citrix Support

MapInfo Professional supports Windows 2003 Server with Terminal Services through Citrix to allow any member of the group *Users* to be able to use MapInfo Professional via a Terminal Services session. The Terminal Services feature is essential to the operation of the Citrix Access Infrastructure.

We recommend that you consult with your Citrix administrator in the Citrix configuration guidelines PDF. That document includes both questions and answers about RAM and CPU requirements. This document is available by clicking this link.
http://support.citrix.com/servlet/KbServlet/download/4257-102-11011/Load_Manager_Guide.pdf.

We have tested MapInfo Professional with a standard install of Citrix v3.0 and Microsoft Terminal Services 2003. We verified the testing of MapInfo Professional on CITRIX v3.0. MapInfo Professional does not require any client side technology, however, Citrix requires the Citrix Client to be installed. We tested against Version 6.20.985 of the client.

We have modified our installation process to ensure that MapInfo Professional operates successfully in a Terminal Services/Citrix environment. When the installer detects that the user is installing locally in a system running Windows 2003 Server with Terminal Services through Citrix, the installer adds the necessary files and components to that machine. Once the user connects for the first time to the Terminal Services/Citrix computer and runs MapInfo Professional, a user configuration process begins to copy the per-user files needed to run MapInfo Professional. This works in the same way for Windows 2003 Server/Citrix clients as any other MapInfo Professional windows client.

During the installation process, if you decide that the default installation locations are not appropriate for your implementation, you can change these locations using the MODE.INI file. For more information about constructing a custom MODE.INI file, see **Controlling the Location of Application Data Files During Installation on page 114.**

The recommended RAM amount is based on the general guidelines from Citrix and uses this formula:

```
Amount of RAM required for the application x the number of concurrent
users
```

Our testing of MapInfo Professional running Citrix on a Pentium CPU suggests these guidelines:

```
64MB of RAM X the number of concurrent users
```

Installing MapInfo Professional on the Citrix Server

Citrix users follow the **Typical Workstation Installation** instructions to install MapInfo Professional.

Note: While we expect to work with ODBC and OCI technology on Citrix, we recommend that your Citrix administrator consult with database vendor documentation to configure their respective drivers on Citrix.

MapInfo Professional Database Connectivity and Support

MapInfo Professional supports the following spatial database servers:

- SQL Server 2000/2005
- Informix 9.x
- Solaris 32-bit
- HPUX
- Oracle Spatial 10G, 9iR2, 9iR1

Further, using ODBC drivers, you can access your data from MapInfo Professional using:

- Oracle ODBC Driver 9x
- SQL Server 2000/2005
- Informix 3.x

You can also open tables of data from the following databases and make them mappable but only for point data:

- Oracle 9iR2
- Oracle 10G
- MS Access XP
- MS SQL Server 2000/2005
- Informix 9.4

For more about working with remote database information, see *Accessing Remote Data* and *Setting your Database Connection Preferences* in the *Help System*.

A Note about SQL Server 2005 Support

MapInfo Professional supports the changes in the MS SQL Server 2005 schema concept. Microsoft has enhanced SQL Server 2005 to use schemas to organize database objects into namespaces. In the past the schema was part of the owner/user construct, so when you deleted a user, you deleted the objects associated with that user.

Using SQL Server 2005, objects are associated with a schema, which can be associated with many users and each user can be associated with many schemas.

The old fully qualified name of a database object was:

*Server.Database.**User**.Object*.

The new fully qualified name of the object is:

*Server.Database.**Schema**.Object*

If you leave out the server and database name identifiers, MapInfo Professional uses the current server and database names. If you do not explicitly specify a schema for a user, the server assumes any unqualified object names are in the default schema. Therefore, if you are accessing a SQL Server 2005 database, you need to update any features/functions, tools, and test scripts accessing the objects, including the metadata in the MAPCATALOG, to use the new fully or partially qualified object name.

To make this version of SQL Server work, you must have this 8.5.1 (or later) version of MapInfo Professional. There is a work around for MapInfo Professional 8.5 and earlier versions that accesses a server table with the form, *Database.Owner.Object*. Review the MapInfo Professional 8.5 *User Guide* for these instructions.

Before You Install MapInfo Professional

Before installing MapInfo Professional, record your serial number and access code in an easy-to-remember place, such as the title page of the *User Guide* or *Supplement*. You need a valid serial number and access code to complete an installation or an upgrade. Also, please complete the postage-paid registration card and return it to MapInfo Corporation. Additionally, you can register online by accessing the Contact Info option on the CD Browser.

If the MapInfo Professional installer detects a current version of the product, 6.0 or earlier, or detects that the product had been installed at some time, the installer copies the MAPINFOW.WOR, STARTUP.WOR and MAPINFOW.PRF from the operating system's system directory to <user profile root>\Application Data\MapInfo\MapInfo.

Application data (appdata) files are the non-executable data files that MapInfo Professional uses during operation.

To use a silent installation procedure, see **Silent Installation Procedures for System Administrators on page 105**.

Navigating the MapInfo Professional CD Browser

The initial screen of the MapInfo Professional CD Browser includes these options:

- *Install Products*: From this option you can install MapInfo Professional (including DBMS support and translators), free data, access to the documentation, and Install Utilities, including: ECW Compressor and GPS.
- *What's New*: Display a list and description of new and enhanced features.
- *Online Reference*: MapInfo Professional provides the following online reference documents: The MapInfo Professional *Supplement*, MapBasic *Reference*, Crystal Reports *User's Guide*, the MapInfo Professional *Printing Guide*, as well as the Adobe Acrobat Reader. The MapInfo Professional and Crystal Reports documentation are copied into the Documentation subfolder of your installation directory during the installation process.
- *Run MapInfo Tutorial:* From this option you can access the MapInfo Tutorial from the MapInfo web site to learn more about the basic features of MapInfo Professional.
- *Other Products*: Display information about MapBasic, MapInfo Discovery, and MapInfo Pro for SQL Server.
- *Contact Information:* Where ever you are, MapInfo is there to help you. Contact us at any of these locations or visit us on the world wide web at www.mapinfo.com!
- *Register Online*: We have simplified the registration process. Simply click this entry and the wizard walks you through the registration process quickly.
- *Browse CD*: From this option you can review the contents of the CD. There are additional utilities that may be useful to you that are only available when you browse.
- *Exit*: From this option you can close the CD Browser application.

Installing MapInfo Professional

CAUTION: **We strongly recommend that you exit from all Windows programs before beginning the installation process. If you are upgrading from an earlier version of MapInfo Professional, we recommend that you uninstall before upgrading.**

You must have Administrator rights to run the Installer on Windows XP.

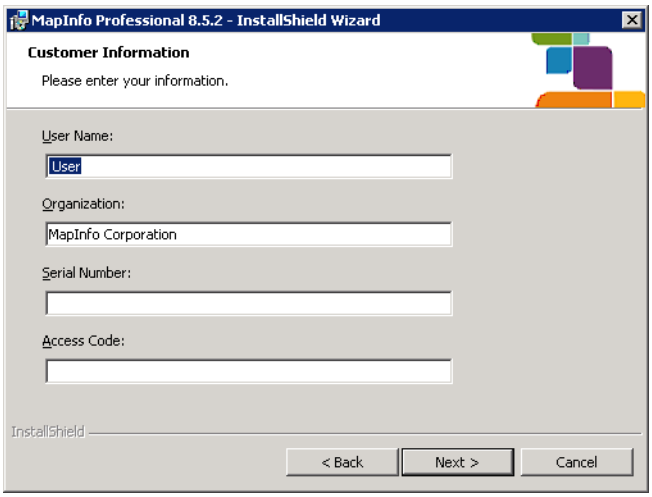
If your Windows **Start** menu does not have a MapInfo program folder, the installation process creates this folder. If your Windows **Start** menu already has a MapInfo program folder, this process creates a new MapInfo icon within that folder.

MapInfo Professional provides its application data files to each user. Called a Per-User install, this functionality runs the first time you run MapInfo Professional or MapInfo Professional client on a machine, and each time the MapInfo Professional Installer is run thereafter. The application data files include, among others, the Pen Styles file, Custom Symbols files, Graph Support files, and Thematic Legend templates. These files allow different users to have custom settings.

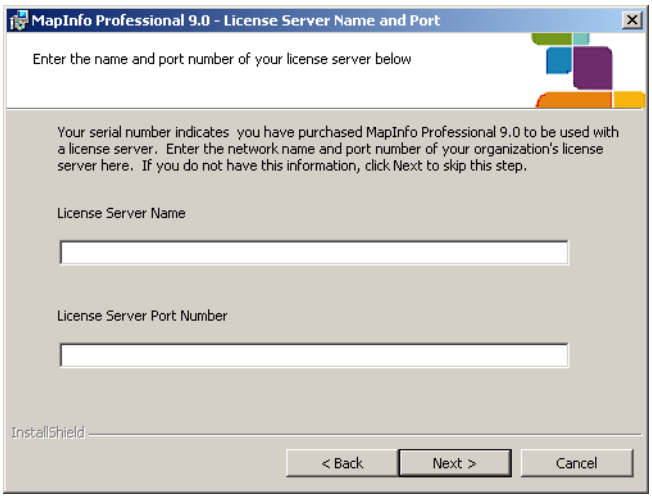
Note: The Installer requires that your TEMP variable be set to a valid directory.

To install MapInfo Professional:

1. On the **Launcher** menu, click **Install Products** from the MapInfo Professional CD Browser.
2. Click **MapInfo Professional Installer**. The Install Shield Wizard dialog box displays. Click **Next** to continue the process and display the License Information dialog box and accept the terms of the agreement.
3. Click **Next** to continue. The Customer Information screen displays.



4. Type your name, organization name, serial number, and access code in the corresponding fields. The serial number and access code are listed on the Product Activation Information Card in the product box and are used to activate your product. Click **Next** to continue.
5. Do one of the following:
   - If your organization purchased node-locked licenses, the third character of your serial number is "N". Skip step 5 and go to **step 6**. For more information, see **Node-Locked Licenses on page 92**.
   - If your organization purchased concurrent licenses, the third character of your serial number is "S". In those cases, the License Server Name and Port dialog box displays on the screen.


MapInfo Professional 9.0 - License Server Name and Port
Enter the name and port number of your license server below
Your serial number indicates you have purchased MapInfo Professional 9.0 to be used with a license server. Enter the network name and port number of your organization's license server here. If you do not have this information, click Next to skip this step.
License Server Name
License Server Port Number
InstallShield
< Back
Next >
Cancel

If you know the license server name and port number, enter them here. If you do not, you can continue with the installation without filling in the license server name and port number. You will have another opportunity to supply this information when you start MapInfo Professional. For more information, see **Concurrent Licenses on page 101**. Click **Next**.

6. Review the following installation types and determine which instructions are appropriate. Click one of the following and click **Next** to continue:

   - **Typical Workstation Installation**. Click this option if you will be using MapInfo Professional as a desktop application including remote database access and connectivity. See **Typical Workstation Installation on page 88** to continue these instructions.
   - **Custom Workstation Installation**. Click this option to restrict the components that are installed by the installation program. For example, you can prevent the installer from adding the help system and tools. See **Custom Workstation Installation on page 88** to continue these instructions.
   - **Network Installation**. Click this option if you are installing or upgrading to a MapInfo Professional network product. See **Network Installation on page 90** to continue these instructions. These instructions are for network administrators only. After you install MapInfo Professional on the network, follow the instructions for installing MapInfo Professional on client equipment in **Setting Up Client Workstations on page 92**.

Typical Workstation Installation

Choose this option to install MapInfo Professional program files, Online Help, Tools, Universal Translator, and Crystal Reports. The ArcLink translation utility is not installed with this option.

CAUTION: **Make sure you have completed the directions in Installing MapInfo Professional on page 85 before beginning these instructions.**

To continue installing MapInfo Professional on a workstation:

1. In the Setup Type dialog box, click **Typical Workstation Installation**; the Destination Folder screen displays. If you have an earlier version (or versions) of MapInfo Professional installed and you do not want to overwrite that version, create a new directory name in the next step.
2. Do one of the following:
   - Click **Next** to accept the destination folder indicated
   - Click **Change** to create a new path in the Change Current Destination Folder dialog box. Type the new path in the **Folder name** field and click **OK** to continue. Click **Next** to continue.

     The Ready to Install the Program screen displays. Review your selections to ensure that the path is correct before moving on. Click **Back** to make changes.
3. Click **Install** to begin. A progress bar indicates the status of the process.
4. When the InstallShield Wizard Complete screen displays, choose **Finish** to return to the Install Products screen.

Note: When you open MapInfo Professional for the first time, the final installation and configuration process takes place automatically. See **MapInfo Licensing and Activation on page 92** before you begin using MapInfo Professional.

Custom Workstation Installation

Choose this installation type to select components and drivers within the MapInfo Professional installation program. This is particularly useful if you want to save disk space by not installing the Help System, the documentation, or the MapInfo Professional tools.

CAUTION: **Make sure you have completed the directions in Installing MapInfo Professional on page 85 before beginning these instructions.**

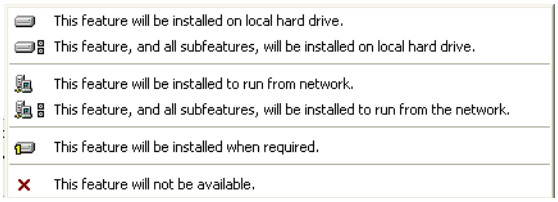
To continue installing using the custom workstation instructions:

1. In the Setup Type dialog box, click **Custom Workstation Installation**; the Custom Setup dialog box displays. A feature description, and the space required for the feature and its sub-features displays in the Feature Description area.
2. In the Custom Setup dialog box you decide what components are to be installed and the directory you want them to install to. Click the feature icon to select the feature for installation.

   The options for a Custom Setup include:
   - **MapInfo Program Files** (which are required to run MapInfo Professional)
   - **Tools** (which refer to the MapInfo Utility Tools, Crystal Reports etc.)
   - **Translators** (such as ArcLink)

- **Help Files**
- **Documentation**

3. To select a feature, click the **Down Arrow** beside it; a menu displays.


This feature will be installed on local hard drive.
This feature, and all subfeatures, will be installed on local hard drive.
This feature will be installed to run from network.
This feature, and all subfeatures, will be installed to run from the network.
This feature will be installed when required.
This feature will not be available.

4. For each feature you want to install, select one of the following:
   - This feature will be installed on local hard drive.
   - This feature, and all subfeatures, will be installed on local hard drive
   - This feature will not be available

   Note: For some features, there are additional options pertaining to the use of the feature from the network. Choose the option that describes your systems implementation of this feature.

   When you select the first or second options in the bullets described above, the feature installs on your local hard drive in the default folder. This path displays in the **Install To:** entry below the Custom Setup list pane. To specify another path, select **Change** button. When you do the Current Destination folder dialog box displays allowing you to choose a new path.

   To see if you have enough space on your hard drive or other mapped resources, click the **Space** button. The Disk Space Requirement dialog box displays the disk size, the amount of available space, and the amount of space the selected install would take.

   Note: To avoid installing a subfeature, select **This feature will not be available**.

5. After you select all the custom options click **Next** to display the Ready to Install the Program dialog box.
6. Click the **Install** button to begin the installation of MapInfo Professional with the features you selected. The Installing MapInfo Professional screen displays with a progress bar indicating the status.
7. At the end of the installation, the prompt: “Would you like to check our web site for any current updates to our product?” displays. If you have an Internet connection, click **Yes** to access the MapInfo Corporation web site containing information about product updates.
8. When the InstallShield Wizard Complete screen displays, choose **Finish** to return to the Install Products screen.

Note: When you open MapInfo Professional for the first time, the final installation and configuration process takes place automatically.

Setting up MDAC

When installing MapInfo Professional, you can choose whether or not to install MDAC (Microsoft Data Access Components). Microsoft Data Access Components include various components: ActiveX Data Objects (ADO), OLE DB, and Open Database Connectivity (ODBC). If you are unsure

whether or not to install the MDAC, consult with your network administrator. This choice allows IT administrators to manually install their own replacement modules for the MDAC. You must have MDAC, or a replacement, to connect to any databases.

Adding ODBC and OCI Drivers

After you add the ODBC and OCI drivers as part of the Typical Installation process, you can use the instructions in *Setting your Database Connection Preferences* in the *Help System* to set your database connection preferences.

You must have the OCI and ODBC drivers installed for MapInfo Professional to connect to remote databases. If you see the following messages, then you have installed the MapInfo DLLs for these features correctly but the drivers are missing:

OCI (Oracle Call Interface)

```
The MapInfo Oracle OCI Database driver (MIDLOCI.DLL) failed to load.
This is most commonly caused by not having an installation of Oracle's OCI
driver, which is necessary for the MapInfo Oracle OCI Database driver to
load.
To fix this issue, please install the Oracle OCI Database driver or rerun
the MapInfo Professional Installer to remove the MapInfo Oracle OCI
Database driver.
Clicking "OK" will allow you to run MapInfo Professional without the
ability to open Oracle tables through Oracle's Oracle Call Interface.
If you need more information, please contact MapInfo Technical Support.
```

ODBC (Open DataBase Connectivity)

```
The MapInfo ODBC Database driver (MIDLODBC.DLL) failed to load.
This is most commonly caused by an incomplete installation of MapInfo ODBC
Connectivity Support. To fix this issue, please rerun the MapInfo
Professional Installer to repair or remove the MapInfo ODBC Connectivity
Support.
Clicking "OK" will allow you to run MapInfo Professional without the
ability to open remote database tables through ODBC.
If you need more information, please contact MapInfo Technical Support.
```

A combined message displays if you attempt to add both of these options and neither of them have access to the appropriate database drivers.

Network Installation

Installing MapInfo Professional 9.0 on a network involves two separate procedures:

- Installing the product on a network drive (presumably done by the Network Administrator).
- Setting up users with program manager icons, etc. (presumably done by the user).

Make sure you have completed the directions in **Installing MapInfo Professional on page 85** before beginning these directions.

Choose this installation ONLY if you are a Network Administrator and have full rights to the network.

To continue installing MapInfo Professional 9.0 on a network:

1. Click **Network Installation**; the Administrator Selection Screen displays.

   The options for a Network Setup include:

   - **MapInfo Professional Program Files**
   - **Tools, Translators**
   - **Help Files**

   A feature description, and the space required for the feature, displays in the Feature Description area. Click the option icon to install it.

2. When you select a feature, a menu displays allowing you to choose to install and/or run the feature and its subfeatures from various locations, including your local hard drive or from CD.

   - If you select the hard drive option, the feature will be installed in the path indicated; on your local hard drive in the folder indicated; to specify a different location, choose **Change** to display the Current Destination folder screen.
   - If you choose to install an option to your hard drive, the **Space** button is enabled; choose this button to display the Disk Space Requirement dialog box.

   Note: You can choose to not install a feature by skipping it.

   See *Installing MapInfo Professional on a Network Drive in the Help System* for additional details.

3. After the installation is complete, the prompt: “Would you like to check our web site for any current updates to our product?” displays. If you have an Internet connection, check **Yes** to be connected to the page of the MapInfo Corporation Web site containing information about product updates.

4. When the InstallShield Wizard Complete screen displays, choose **Finish** to return to the Install Products screen.

Note: When your users open MapInfo Professional for the first time, the final installation and configuration process takes place automatically. See **MapInfo Licensing and Activation on page 92** for information on licensing.

Installing MapInfo Professional on a Network Drive

The procedure for installing MapInfo Professional on a network drive is the same as the regular installation procedure except for the following:

- Select Network Installation in the Setup Type screen.
- Continue as in a Workstation Installation, selecting features, destination locations, etc.

The Network Installation alone does not install any files to the local hard drive.

Setting Up Client Workstations

To permit a user to use this network installation of MapInfo Professional, run SETUP.EXE:

1. Map a drive to the MapInfo Professional Install directory.
2. Select **Run** from the **Start** menu.
3. Run SETUP.EXE from [*MapInfo install directory*]\AddClient. The MapInfo Professional Client Welcome screen displays.
4. Click **Next**. The License Information screen displays.
5. Click "**I accept the terms of the license agreement**" and select **Next**. The Customer Information screen displays with the network install values as the default.
6. Modify for the current instance and select **Next**.
7. Click **Install** to continue the installation.
8. Click **Finish** to complete the client installation.
9. Open MapInfo Professional and begin the product activation process. See **MapInfo Licensing and Activation on page 92**.

MapInfo Licensing and Activation

This section describes the licenses available for MapInfo Professional and how to get started with the product according to the type of license your organization purchased.

MapInfo has two licensing schemes:

- Node-locked
- Concurrent

The serial number and access code that you enter during the installation indicates to MapInfo Professional what type of license you have. Depending on the license type, MapInfo Professional will guide you through activating the product (if your organization purchased node-locked licenses) or connecting to a license server (if your organization purchased concurrent licenses).

Node-Locked Licenses

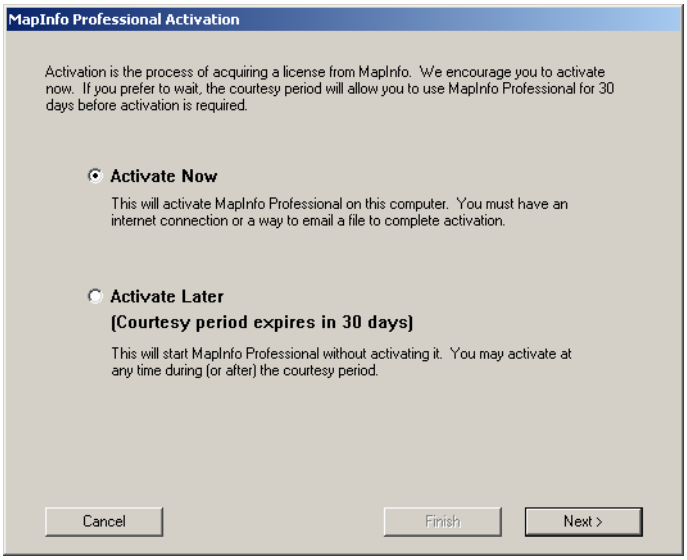
Node-locked licenses enable you to run MapInfo Professional on a specific computer. If you purchased node-locked licenses, your installation of MapInfo Professional must be activated before you can use it. Activation is the process of acquiring a license from MapInfo. This section explains the activation options available for node-locked licenses.

Product Activation

MapInfo uses the serial number and access code you supplied during the installation to activate the product. If you need to refer to these numbers again, the serial number and access code are located on the product box and on the Product Activation Information Card.

To activate MapInfo Professional:

1. Install MapInfo Professional, if you haven't already, and start the product. When you start MapInfo Professional for the first time after installation, the Activation Wizard launches. The MapInfo Professional Activation dialog box displays on the screen.

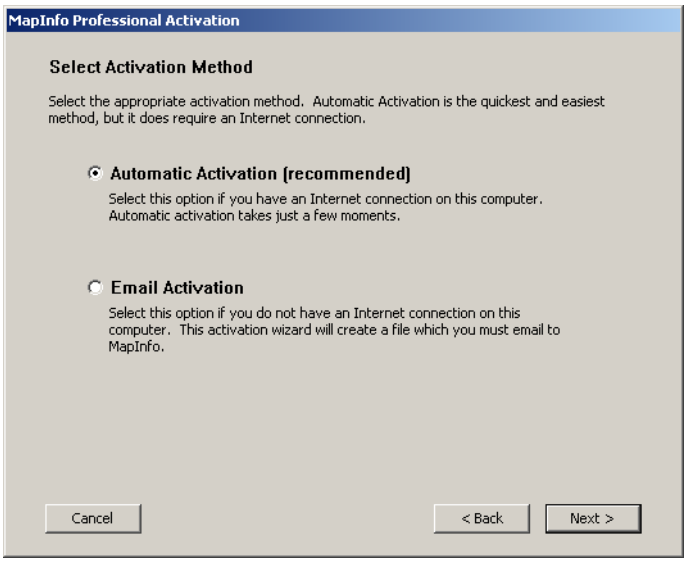

MapInfo Professional Activation
Activation is the process of acquiring a license from MapInfo. We encourage you to activate now. If you prefer to wait, the courtesy period will allow you to use MapInfo Professional for 30 days before activation is required.
Activate Now
This will activate MapInfo Professional on this computer. You must have an internet connection or a way to email a file to complete activation.
Activate Later
(Courtesy period expires in 30 days)
This will start MapInfo Professional without activating it. You may activate at any time during (or after) the courtesy period.
Cancel
Finish
Next >

2. Select when you want to activate MapInfo Professional. Select one of the following:
   - **Activate Now**–Select this option to start activation now.
   - **Activate Later**–Select this options to start a 30-day courtesy period in which you can use MapInfo Professional without activating the product.
3. Click **Next**.

   If you selected **Activate Now**, go to **step 4**.

   If you selected **Activate Later**, the Activation Wizard closes and the courtesy period begins. The courtesy period enables you to use MapInfo Professional immediately and active the product at a time that is convenient for you. Each subsequent time you start MapInfo Professional, a dialog box displays informing you of the time remaining in the courtesy period and giving you the opportunity to activate the product.

   You must activate MapInfo Professional sometime during the courtesy period to avoid interrupting your work. When the courtesy period ends, you will not be able to use MapInfo Professional until you activate it.
4. If you selected **Activate Now**, the Select Activation Method dialog box displays on the screen:

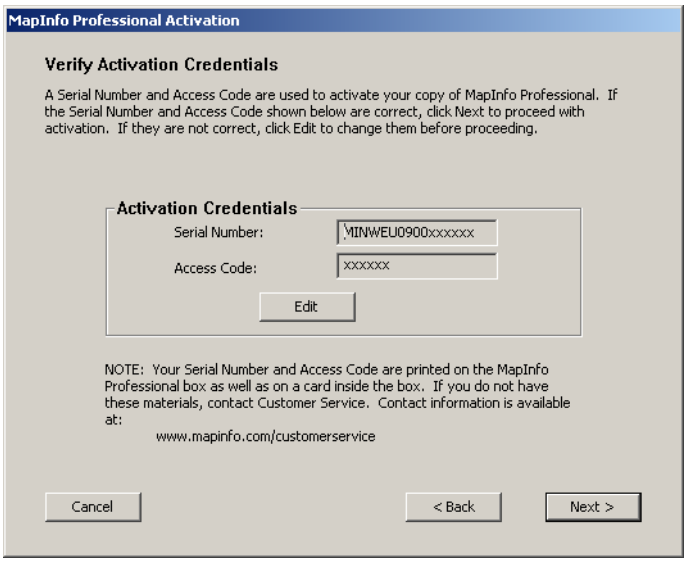

MapInfo Professional Activation
Select Activation Method
Select the appropriate activation method. Automatic Activation is the quickest and easiest method, but it does require an Internet connection.
Automatic Activation (recommended)
Select this option if you have an Internet connection on this computer. Automatic activation takes just a few moments.
Email Activation
Select this option if you do not have an Internet connection on this computer. This activation wizard will create a file which you must email to MapInfo.
Cancel
< Back
Next >

5. Select one of the following activation methods:
   - **Automatic Activation**– Select this option if you have an Internet connection. The Activation Wizard will make a one-time connection with a MapInfo server. Using the serial number and access code you provided during the installation, the Activation Wizard will retrieve one of the licenses your organization purchased and associate it with your computer.
   - **Email Activation**– Select this option if you do not have an Internet connection. The Activation Wizard will guide you through the creation of an Activation Request file that you must then email to MapInfo.
6. Click **Next**.

   If you selected **Email Activation**, go to **step 7**.

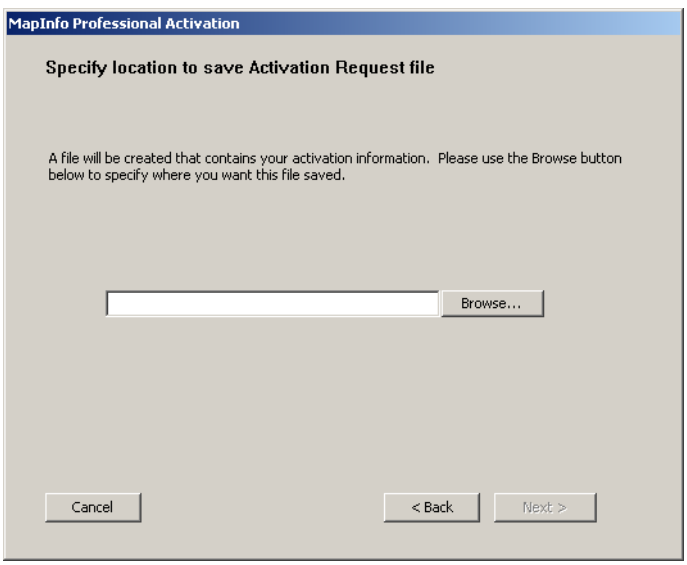
   If you selected **Automatic Activation**, the Activation Wizard takes a few moments to transfer the activation credentials to MapInfo and perform the activation. A MapInfo Activation message displays on the screen to tell you that the activation was successful.

   Click **OK**. The Activation Wizard closes, and MapInfo Professional is ready to use. You are finished.
7. If you selected **Email Activation**, the Verify Activation Credentials dialog box displays on the screen:


MapInfo Professional Activation
Verify Activation Credentials
A Serial Number and Access Code are used to activate your copy of MapInfo Professional. If the Serial Number and Access Code shown below are correct, click Next to proceed with activation. If they are not correct, click Edit to change them before proceeding.
Activation Credentials
Serial Number:
MINWEU0900xxxxxx
Access Code:
xxxxxx
Edit
NOTE: Your Serial Number and Access Code are printed on the MapInfo Professional box as well as on a card inside the box. If you do not have these materials, contact Customer Service. Contact information is available at:
www.mapinfo.com/customerservice
Cancel
< Back
Next >

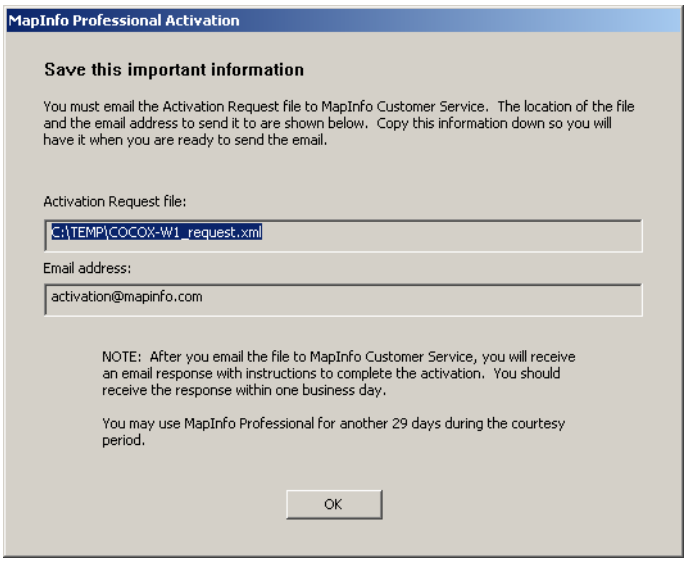
Double-check that your serial number and access code are correct. Click **Edit** if you need to make any corrections.

8. Click **Next**. The Specify location to save Activation Request file dialog box displays on the screen:


MapInfo Professional Activation
Specify location to save Activation Request file
A file will be created that contains your activation information. Please use the Browse button below to specify where you want this file saved.
Browse...
Cancel
< Back
Next >

Select a folder in which to save the Activation Request file. Click the **Browse** button to navigate to the desired location. Click **OK**. The path and filename of the Activation Request file appear in the box. The Activation Request contains your serial number and access code, plus information that identifies the computer you are activating on.

9. Click **Next**. The Save this important Information dialog box displays on the screen.


MapInfo Professional Activation
Save this important information
You must email the Activation Request file to MapInfo Customer Service. The location of the file and the email address to send it to are shown below. Copy this information down so you will have it when you are ready to send the email.
Activation Request file:
C:\TEMP\COCOX-W1_request.xml
Email address:
activation@mapinfo.com
NOTE: After you email the file to MapInfo Customer Service, you will receive an email response with instructions to complete the activation. You should receive the response within one business day.
You may use MapInfo Professional for another 29 days during the courtesy period.
OK

This dialog box provides the information to send your Activation Request file to MapInfo. The full path and filename of the Activation Request file is displayed in the **Activation Request File** box. The email address to send the file, activation@mapinfo.com, is displayed in the **Email address** box.

Take a few moments to write down the location of the Activation Request file and email address to send the Activation Request file.

CAUTION: **Please do not edit the Activation Request file in any way. If you do, MapInfo may not be able to process it and your activation will be delayed.**

10. Click **OK**. The Activation Wizard closes and the courtesy period automatically starts.

11. Email your Activation Request to MapInfo at this address:

activation@mapinfo.com

You can finish email activation when you receive an Activation Response file from MapInfo. You should receive the Activation Response file within one business day.

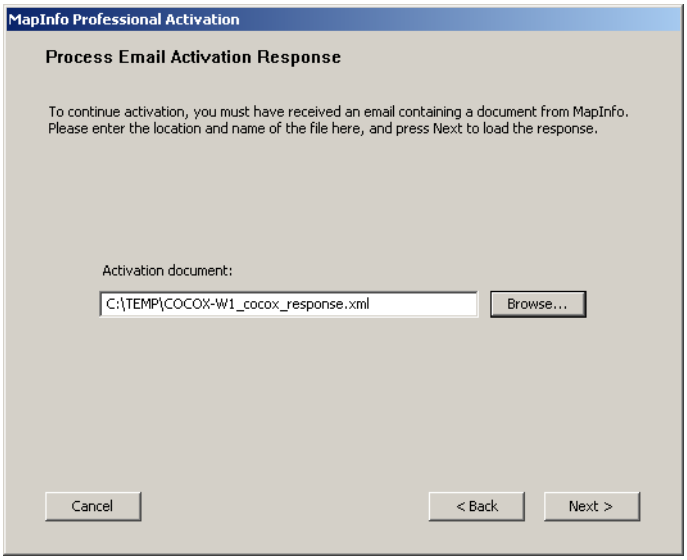
Finishing Email Activation

When you receive the Activation Response file from MapInfo, you are ready to finish activating MapInfo Professional.

To finish email activation:

1. Copy the Activation Response file you received from MapInfo to an accessible folder on your computer and make note of the location.
2. Open MapInfo Professional. If MapInfo Professional is already open, exit and restart the program. A dialog box displays asking you if you want to finish activating MapInfo Professional.
3. Click **Yes**. The Process Email Activation Response dialog box displays on the screen.

4. Click **Browse** to navigate to the location of the Activation Response file. Click **Open** in the Locate Response file dialog box when you have located the file.
5. The path and filename of the Activation Response file appear in the box.


MapInfo Professional Activation
Process Email Activation Response
To continue activation, you must have received an email containing a document from MapInfo.
Please enter the location and name of the file here, and press Next to load the response.
Activation document:
C:\TEMP\COCOX-W1_cocox_response.xml
Browse...
Cancel
< Back
Next >

6. Click **Next**.
7. A MapInfo Activation message displays on the screen to tell you that the activation was successful. Click **OK**. The MapInfo Professional Activation Wizard closes, and MapInfo Professional is activated and ready to use. You are finished.

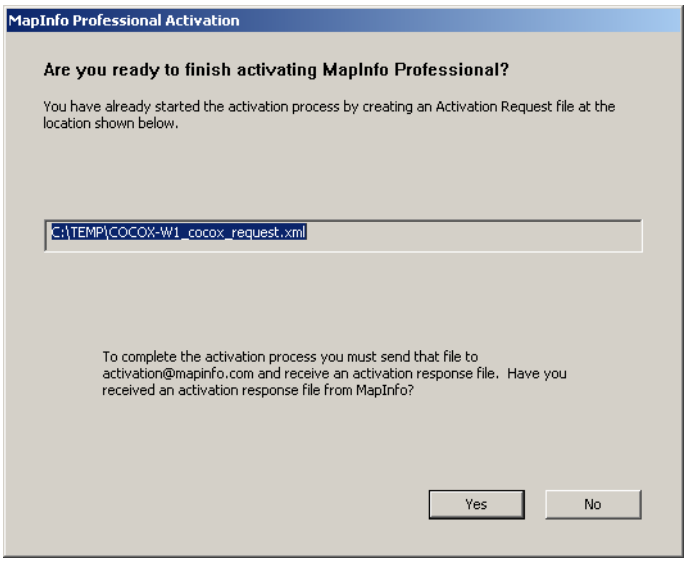
Note: Once you have seen the confirmation message stating that your product has been activated, you can delete the email response file from your system.

To check the status of your activation, choose **Help > About** and review the contents of this dialog box.

Using MapInfo Professional While You Wait

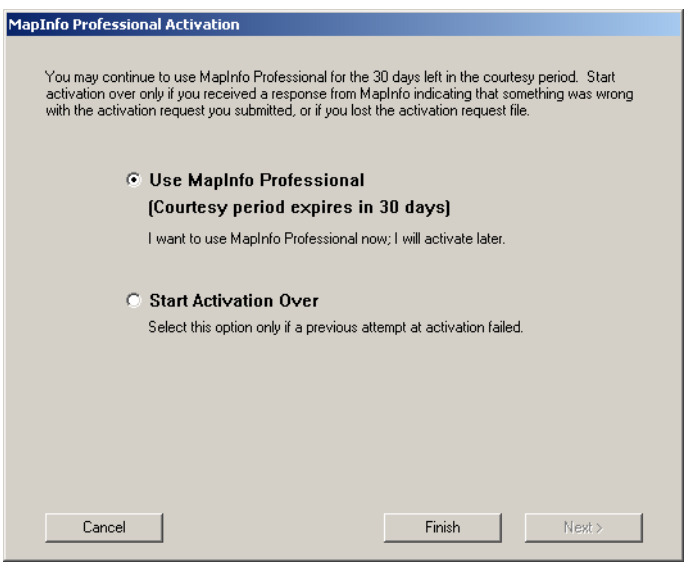
While you are waiting for MapInfo to send you the Activation Response file, you can continue to use MapInfo Professional under the courtesy period. To ensure uninterrupted use of MapInfo Professional, we encourage you to activate before the courtesy period expires.

Each time you open MapInfo Professional subsequent to initiating email activation, a dialog box displays asking if you want to finish activating MapInfo Professional. When you receive the Activation Response file from MapInfo you are ready to finish activation.


MapInfo Professional Activation
Are you ready to finish activating MapInfo Professional?
You have already started the activation process by creating an Activation Request file at the location shown below.
C:\TEMP\COCOX-W1_cocox_request.xml
To complete the activation process you must send that file to activation@mapinfo.com and receive an activation response file. Have you received an activation response file from MapInfo?
Yes
No

To continue using MapInfo Professional under the courtesy period:

1. Click **No** in the dialog box.
2. A dialog box displays on the screen that provides information about the courtesy period and asks you how you would like to proceed.


MapInfo Professional Activation
You may continue to use MapInfo Professional for the 30 days left in the courtesy period. Start activation over only if you received a response from MapInfo indicating that something was wrong with the activation request you submitted, or if you lost the activation request file.
Use MapInfo Professional
(Courtesy period expires in 30 days)
I want to use MapInfo Professional now; I will activate later.
Start Activation Over
Select this option only if a previous attempt at activation failed.
Cancel
Finish
Next >

Select one of the following:

- **Use MapInfo Professional**–Select this option if you have not received an Activation Response file yet and you want to use MapInfo Professional under the courtesy period.
- **Start Activation Over**–Select this option if previous activation attempts have failed.

If you selected **Use MapInfo Professional**, click **Finish**. The Activation Wizard closes and MapInfo Professional is ready to use under the courtesy period. You can finish the activation at a later time.

If an earlier attempt to activate MapInfo Professional failed, and you selected **Start Activation Over**, click **Next**. The Activation Wizard restarts, giving you the opportunity to try the activation again.

Transferring a Node-Locked License

Node-locked licenses are associated with a particular computer. To use MapInfo Professional on a computer other than the one on which you have it activated, and without consuming another license, you can transfer your license from one computer to another. For example, you received a new computer at work and you want to run MapInfo Professional on the new computer instead of on the old one.

Note: Your organization is limited to two license transfers per year, regardless of the number of licenses.

Transferring Your License to Another Computer

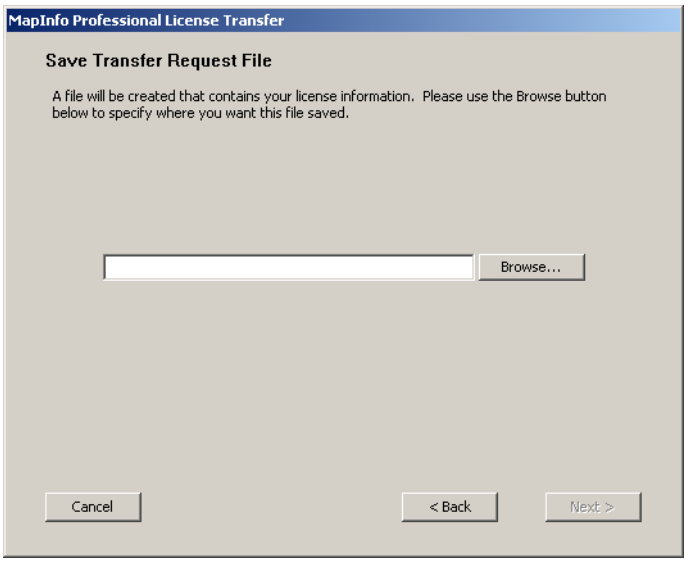
To transfer a node-locked license:

1. Open MapInfo Professional.
2. Choose **Help > Licensing > Transfer license**. The MapInfo Professional License Transfer dialog box displays on the screen.
3. Click **Yes**. The Select Transfer Method dialog box displays on the screen.

   Select one of the following transfer methods:

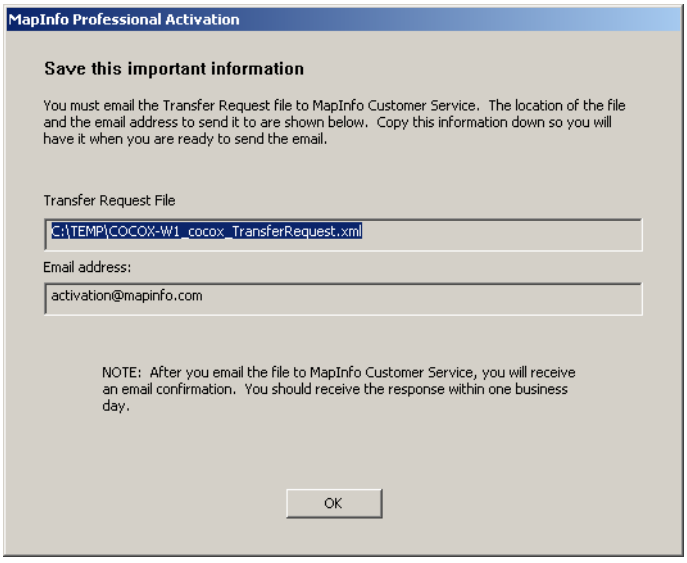
   - **Automatic Transfer**–Select this option if you have an Internet connection. Your license will be automatically transferred to MapInfo. You can retrieve the license by activating MapInfo Professional on another computer.
   - **Email Transfer**–Select this option if you do not have an Internet connection. You will be guided through the creation of a Transfer Request file, which you must then email to MapInfo.
4. If you selected **Email Transfer**, go to **step 6**.

   If you selected **Automatic Transfer**, the License Transfer Wizard takes a few moments to transfer the license to MapInfo. When this process is finished, a message displays on the screen informing you that the transfer was successful.
5. Click **OK**. MapInfo Professional closes and can no longer be run from this computer. The license is now available for you to activate MapInfo Professional on another computer.
6. If you selected **Email Transfer**, the Save Transfer Request File dialog box displays on the screen.


MapInfo Professional License Transfer
Save Transfer Request File
A file will be created that contains your license information. Please use the Browse button below to specify where you want this file saved.
Browse...
Cancel
< Back
Next >

Select a folder in which to save the Transfer Request file. Click the **Browse** button to navigate to the desired location. Click **OK**.

7. Click **Next**. The Save this important information dialog box displays on the screen.


MapInfo Professional Activation
Save this important information
You must email the Transfer Request file to MapInfo Customer Service. The location of the file and the email address to send it to are shown below. Copy this information down so you will have it when you are ready to send the email.
Transfer Request File
C:\TEMP\COCOX-W1_cocox_TransferRequest.xml
Email address:
activation@mapinfo.com
NOTE: After you email the file to MapInfo Customer Service, you will receive an email confirmation. You should receive the response within one business day.
OK

This dialog box provides the information to send your Transfer Request file to MapInfo Customer Service.

The full path and filename of the Transfer Request file is displayed in the **Transfer Request File** box. The email address to send the file, activation@mapinfo.com, is displayed in the **Email address** box.

Take a few moments to write down the location of the Transfer Request file and email address to send the Transfer Request file.

CAUTION: **Please do not edit the Activation Request file in any way. If you do, MapInfo may not be able to process it and your activation will be delayed.**

8. Click **OK**. MapInfo Professional closes and can no longer be run on this computer unless you activate it again.
9. Email the Transfer Request file to MapInfo at the following address:

   activation@mapinfo.com
10. MapInfo Customer Service will send you an email reply confirming that the transfer was successful. You should receive this confirmation within one business day.

The license is now available for you to activate MapInfo Professional on another computer.

Uninstall Transfer Options

If you have a node-locked license and you uninstall MapInfo Professional, you have the option of transferring the license to MapInfo.

If you intend to install MapInfo Professional on another computer, transfer the license to MapInfo so that the license is available. When you install MapInfo Professional on the desired computer, you will be prompted to activate the product.

If you intend to reinstall MapInfo Professional on the same computer, do not transfer the license. When you reinstall, you can reuse the same license without activating.

When you begin an uninstall of MapInfo Professional, the Transfer LIcense Now? dialog box displays on the screen:

Do one of the following:

- Click **Yes** to transfer the license to MapInfo. The License Transfer Wizard will start and guide you through the transfer process. See **Transferring Your License to Another Computer on page 99**
- Click **No** to keep the license on this computer. The uninstall operation continues. When you reinstall MapInfo Professional, you can reuse the license without activating.

Concurrent Licenses

Concurrent licenses enable you to install MapInfo Professional on any number of computers. A license server, installed and maintained by your organization, limits the number of computers that can run MapInfo Professional at any given time to the number of concurrent licenses purchased by your organization.

In the concurrent licensing scheme, you must connect to a license server on your network to check out a license before you can run MapInfo Professional. Checking out a license is the process of obtaining a license from the license server. You will need to supply the license server machine name and port number to connect to the license server. You can do this either during installation or the first time you run MapInfo Professional. After you have established a license server connection, the check out occurs automatically.

A license server administrator from your organization installs and maintains the license server. The license server administrator must also perform the following tasks:

- Activate the license server to make licenses available for check out.
- Inform users of the license server machine name and port number.

Connecting to a License Server

If your organization purchased concurrent licenses for MapInfo Professional, you will need to connect to a license server to run the product.

To connect to the license server, MapInfo Professional must have the license server name and port number. Your license server administrator will provide you with this information.

Connecting During Installation

The installation program will ask you for the license server name and port number. If you know them at install time, enter them. When you start MapInfo Professional, you will be connected to the license server and a license will be checked out automatically.

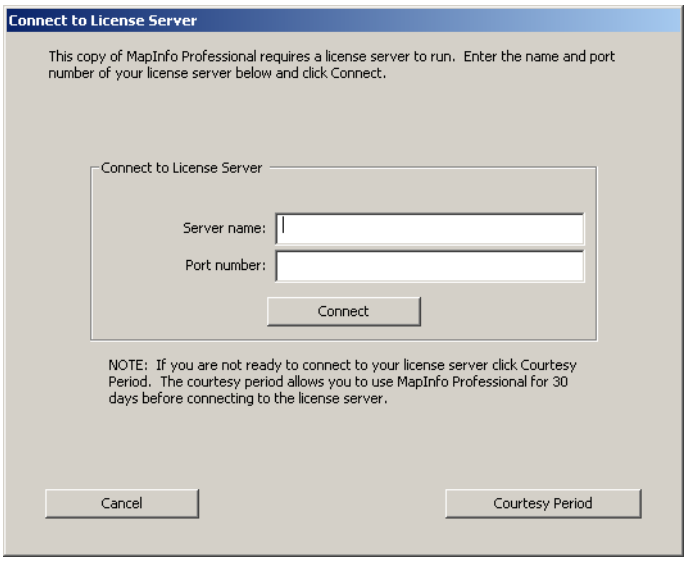
If you do not have this information at the time you install MapInfo Professional, the installation program will enable you to continue with the installation without filling in the license server name and port number. You will have another opportunity to connect to the server when you start MapInfo Professional.

Connecting After Installation

If you did not specify the license server name and port number during product installation, you will be prompted for that information when you start MapInfo Professional. You will also be prompted if MapInfo Professional cannot connect to a running license server using the server name and port number you provided at install.

To connect to the license server after you install MapInfo Professional:

1. Start MapInfo Professional. The Connect to License Server dialog box displays on the screen.


Connect to License Server
This copy of MapInfo Professional requires a license server to run. Enter the name and port number of your license server below and click Connect.
Connect to License Server
Server name:
Port number:
Connect
NOTE: If you are not ready to connect to your license server click Courtesy Period. The courtesy period allows you to use MapInfo Professional for 30 days before connecting to the license server.
Cancel
Courtesy Period

   If you have the license server name and port number, proceed with these instructions. If you do not, see **Starting the Courtesy Period on page 103**.

2. Enter the license server name in the **Server name** box.
3. Enter the port number in the **Port number** box.
4. Click **Connect**. MapInfo Professional takes a few moments to connect to the license server and check out a license.

When the license is checked out, the Connect to License Server dialog box closes. You are finished. MapInfo Professional is licensed and ready to use. After you successfully connect to your license server once, a license will be checked out automatically when you start MapInfo Professional.

Starting the Courtesy Period

If you do not have the license server name and port number, but you want to start using MapInfo Professional, you can start a 30-day courtesy period during which you can use MapInfo Professional without connecting to the license server.

To use the courtesy period to run MapInfo Professional:

1. Open MapInfo Professional. The Connect to License Server dialog box displays on the screen.
2. Click **Courtesy Period**. A MapInfo Activation message displays telling you that the courtesy period started successfully.
3. Click **OK**. MapInfo Professional is ready to use under the courtesy period.

You can connect to the license server and check out a license when you receive the license server name and port number from your license server administrator.

Connection Failures

Failure to connect to the license server can occur for several reasons.

First, although you may know the license server name and port number, the license server administrator may not have had an opportunity to install it yet. In this case, MapInfo Professional cannot find the license server you specified. To use MapInfo Professional, you can start the courtesy period, and then connect when you know that the license server has been installed and is running.

Failures can also occur if the license server has been moved to a different computer. In this case, you were previously able to connect to the license server, but the license server was moved since the last time you used MapInfo Professional. MapInfo Professional is looking for the license server in its previous location. If MapInfo Professional cannot connect to the license server at startup, the Connect to License Server dialog will display on the screen. See **Connecting After Installation on page 102** for information. See your license server administrator for the correct license server name.

Finally, if all licenses have been checked out, you will not be able to run MapInfo Professional. You are able to connect to the license server, but you cannot check out a license because they are all in use. You will need to wait until a license becomes available before you can check out a license.

Borrowing a Concurrent License

Some concurrent licenses can be borrowed. Borrowed license enable you to use MapInfo Professional when your computer is not able to connect to your license server. For example, if you have MapInfo Professional installed on a laptop computer and you are going to be away from the office, you can borrow a license to use MapInfo Professional while you are away. Check with your license server administrator to find out if your concurrent license includes borrowing.

When you borrow a license, be sure to specify a borrow period that gives you sufficient time to use MapInfo Professional before the license expires. If the license expires before you have an opportunity to return it, the license is automatically returned to the license server. MapInfo Professional is unusable until you can connect to your network again and check out a license.

To borrow a license, the computer that you want to put the borrowed license on must have MapInfo Professional installed and be connected to the license server.

To borrow a license:

1. Open MapInfo Professional.
2. Choose **Help > Licensing > Borrow license**. The Borrow MapInfo Professional License dialog box displays on the screen.
3. Specify the number of days that you want to borrow the license. You can specify from one to 365 days.
4. Click **Borrow License**. After a few moments, MapInfo Activation message displays on the screen to tell you that the license was borrowed from the server successfully.
5. Click **OK**.

You can use MapInfo Professional on this computer while not connected to your network for the borrow period that you specified.

Returning a Borrowed License

To return a borrowed license, you must reconnect the computer that is using the borrowed license to your network. If it is not connected, the Return borrowed license command will not be available.

To return a borrowed license:

1. Reconnect the computer to your network.
2. Open MapInfo Professional. A dialog box displays to tell you on what date the borrowed license is going to expire.
3. Click **OK**.
4. Choose **Help > Licensing > Return borrowed license**. The Return borrowed license to license server dialog box displays on the screen.
5. This dialog box explains how a license is returned. Click **OK**.
6. A MapInfo Activation message displays on the screen to tell you that the license has been returned to the license server.
7. Click **OK**.

Silent Installation Procedures for System Administrators

Silent installations allow you to repackage MapInfo Professional for deployment within your company so your users do not have to enter user- or company-specific information, path information, Oracle or ODBC DLLs, a serial number, or an access code.

The MapInfo Professional installation setup.exe indicated in the steps below can be found on the installation CD (d:\) in this directory:

```
\Install\MI_PRO\DISK1
```

In general, the silent installation process goes like this:

1. Place the installation CD in the target computer's disk drive.
2. From the command line on the target computer, type:

```
"d:\Install\MI_PRO\DISK1\setup.exe /s /v"PARAMETERS"
```

where `PARAMETERS` are the parameters you set to populate the msiexec.

For example:

```
"\Install\MI_PRO\DISK1\setup.exe /s /v"/qb
INSTALLDIR=\"[PathTo]\MapInfo\OtherThanStandard\Professional 9.0\"
USERNAME=\"MyUser\" COMPANYNAME=\"MyCompanyName\"
PIDKEY=\"MySerialNumber\" ACCD=\"MyAccessCode\""
```

For concurrent licenses the parameters for the license server name and license server port number must also be included:

1. Place the installation CD in the target computer's disk drive.
2. From the command line on the target computer, type:

```
"d:\Install\MI_PRO\DISK1\setup.exe /s /v"PARAMETERS"
```

where `PARAMETERS` are the parameters you set to populate the msiexec.

For example:

```
"\Install\MI_PRO\DISK1\setup.exe /s /v"/qb
INSTALLDIR=\"[PathTo]\MapInfo\OtherThanStandard\Professional 9.0\"
USERNAME=\"MyUser\" COMPANYNAME=\"MyCompanyName\"
PIDKEY=\"MySerialNumber\" ACCD="MyAccessCode"
LSNAME=\"MyLicenseServerName\" LSPN=\"MyLicenseServerPortNumber\""
```

Look for the type of installation you want to perform from the options below and follow the corresponding instructions. In each of the install scenarios described below, the serial number and access code parameters are given in the following format:

- `PIDKEY=MI###############`
- `ACCD=######`

Substitute the appropriate serial number and access code when you perform the silent install.

Completely Silent Install

To initiate a silent install:

1. Place the installation CD in the target computer's disk drive.
2. From the command line on the target computer, type:

```
"d:\Install\MI_PRO\DISK1\setup.exe" /s /v"/q PIDKEY=MI###############
ACCD=######"
```

For concurrent licenses, the license server name and port number parameters must be included:

- `LNAME="LicenseServerName"`
- `LSPN="LicenseServerPortNumber"`

Substitute the appropriate license server name and port number when you perform the silent install.

Silent Install with an Initial Dialog Box Only

To initiate a silent install where a single dialog box displays to initiate the installation:

1. Place the installation CD in the target computer's disk drive.
2. From the command line on the target computer, type:

```
"d:\Install\MI_PRO\DISK1\setup.exe" /s /v "/qb PIDKEY=MI###############
ACCD=######"
```

For concurrent licenses, the license server name and port number parameters must be included:

- `LNAME="LicenseServerName"`
- `LSPN="LicenseServerPortNumber"`

Substitute the appropriate license server name and port number when you perform the silent install.

Silent Install with Progress Bar Only

To initiate a silent install where the progress bar displays but users do not have to make entries:

1. Place the installation CD in the target computer's disk drive.
2. From the command line on the target computer, type:

```
"d:\Install\MI_PRO\DISK1\setup.exe" /s /v "/qb
PIDKEY=\"MI###############\" USERNAME=\"FRED\" ACCD=\"######\"
COMPANYNAME=\"My Company\" InstallDir=\"c:\Program Files\MapInfo\""
```

   where you substitute the user's username for `FRED`, the organization's name for `My Company`, and the installation directory path for the `c:\Program Files\MapInfo\` entry.

There are three caveats with this process:

- The user is prompted to reboot, if necessary
- The developer must populate the registration info with specific info
- The developer must specify the installation directory

Note: MIDLODBC.DLL or MIDLOCI.DLL are NOT installed using this case.

For concurrent licenses, the license server name and port number parameters must be included:

- `LNAME="LicenseServerName"`
- `LSPN="LicenseServerPortNumber"`

Substitute the appropriate license server name and port number when you perform the silent install.

Silent Install that Installs the Oracle Library List Only

To initiate a silent install that installs the Oracle DLL:

1. Place the installation CD in the target computer's disk drive.
2. From the command line on the target computer, type:

```
"d:\Install\MI_PRO\DISK1\setup.exe" /s /v "/q PIDKEY=MI###############
ACCD=###### OCIDLL=TRUE"
```

Note: MIDLODBC.DLL is NOT installed using this case.

For concurrent licenses, the license server name and port number parameters must be included:

- `LNAME="LicenseServerName"`
- `LSPN="LicenseServerPortNumber"`

Substitute the appropriate license server name and port number when you perform the silent install.

Silent Install that Installs Both the Oracle and ODBC Library Lists

To initiate a silent install that installs the Oracle and ODBC DLLs:

1. Place the installation CD in the target computer's disk drive.
2. From the command line on the target computer, type:

```
"d:\Install\MI_PRO\DISK1\setup.exe" /s /v "/q PIDKEY=MI############## 
ACCD=###### OCIDLL=TRUE ODBCDLL=TRUE"
```

For concurrent licenses, the license server name and port number parameters must be included:

- `LNAME="LicenseServerName"`
- `LSPN="LicenseServerPortNumber"`

Substitute the appropriate license server name and port number when you perform the silent install.

Silent Install that Installs the ODBC Library List Only

To initiate a silent install that installs the Oracle and ODBC DLLs:

1. Place the installation CD in the target computer's disk drive.
2. From the command line on the target computer, type:

```
"d:\Install\MI_PRO\DISK1\setup.exe" /s /v "/q PIDKEY=MI############## 
ACCD=###### ODBCDLL=TRUE"
```

Note: The MIDLOCIDLL is NOT installed using this case.

For concurrent licenses, the license server name and port number parameters must be included:

- `LNAME="LicenseServerName"`
- `LSPN="LicenseServerPortNumber"`

Substitute the appropriate license server name and port number when you perform the silent install.

Silent Install that Installs ArcLink

To initiate a silent install that installs ArcLink:

1. Place the installation CD in the target computer's disk drive.
2. From the command line on the target computer, type:

```
"d:\Install\MI_PRO\DISK1\setup.exe" /s /v "/q PIDKEY=MI############## 
ACCD=###### ADDARC=TRUE"
```

For concurrent licenses, the license server name and port number parameters must be included:

- `LNAME="LicenseServerName"`
- `LSPN="LicenseServerPortNumber"`

Substitute the appropriate license server name and port number when you perform the silent install.

Silent Install with an Initial Dialog Box that Installs ArcLink

To initiate a silent install with an initial dialog box that installs ArcLink:

1. Place the installation CD in the target computer's disk drive.
2. From the command line on the target computer, type:

```
"d:\Install\MI_PRO\DISK1\setup.exe" /s /v "/qb PIDKEY=MI############## 
ACCD=###### ADDARC=TRUE"
```

This process runs the Smartupdate at end of installation. If you do not want the Smartupdate to run, type:

```
set RUNSU = FALSE
```

at the end of the command line.

For concurrent licenses, the license server name and port number parameters must be included:

- `LNAME="LicenseServerName"`
- `LSPN="LicenseServerPortNumber"`

Substitute the appropriate license server name and port number when you perform the silent install.

Installing Data

To help you get started, MapInfo provides you with some United States-based and world-wide maps you can use as a background to your data. Use these instructions to install this free data.

To install the free data provided with MapInfo Professional:

1. Choose **Install Products** from the CD Browser.
2. Choose **Free Data** to display the MapInfo Professional Data screen. In this screen, you can also review the data specifications, access new data over the web and learn about what data is available from MapInfo Corporation.
3. Choose **Install Free Data**. The Welcome screen displays.
4. Choose **Next** to continue. The License Information screen displays.
5. Choose **Yes** to accept the terms of the agreement and to continue the installation process. The Choose Destination Location screen displays.
6. Select the product for which you will be installing the data and click **Next** to continue:
   - MapInfo Professional
   - MapInfo Run Time
7. Specify the directory where the data will be installed. Use the **Browse** button to select a directory if necessary or accept the default directory. Click **Next** to continue.

8. Choose one of these options:
   - **Custom Install***:* Choose which datasets to install. Select the check box beside each dataset you want to install. The size of each dataset displays, as well as space required and space available.

     To see the subcomponents of the data you selected, click **Change**.
   - **Typical Install***:* Install all datasets.

     Choose **Next** to continue. Respond **Yes** to the "Would you like setup to display workspace Icons" prompt if you want to create an icon for each data set you choose.
9. The **Select Program Folder** screen displays if you chose to set up Workspace icons. Select the program folder where the icons will be created. Choose **Next**.
10. The **Start Copying Files** screen displays. Review the selections you have chosen and click **Back** to return to any screen to change your selections. When you are ready to begin the installation, click **Next**.
11. The Setup Complete dialog box displays; click **Finish**.

Getting More Data

To learn more about our data products, click the **Get More Data** option in the MapInfo Professional Data screen during the Data Installation process or click **MapInfo Data Products on the Web** in the **Help** Menu. If you have a Browser installed, you will be automatically connected to MapInfo Corporation's web site, where we provide detailed information about MapInfo's World Wide Data Products. We have over 350 data products to choose from—products that provide both reliable and current information.

Installing Related Programs, Hardware, and Resources

This section contains the instructions for installing the ECW Compressor, the Blue Marble GPS, and the documentation associated with MapInfo Professional. We also include information about the Microsoft IntelliMouse and how to use it.

Installing the ECW Compressor

The ECW raster handler allows you to open and display raster images compressed in the ECW format. We recommend that you exit all Windows programs before installing.

1. Choose **Install Products** from the MapInfo Professional 9.0 CD Browser.
2. Choose **ECW Compressor**. The Welcome screen displays. Choose **Next** to continue the installation process.
3. The Software License screen displays. Choose **Yes** to accept the terms of the agreement and to continue the installation process.
4. The Choose Destination Location screen displays. Specify the directory where ECW Compressor will be installed.
5. The Select Program Folder screen displays. Select a folder. Choose **Next** to continue.

6. The Setup Complete screen displays: choose to display the ReadMe file and/or create a shortcut on your desktop. Choose **Finish**.

Using the Microsoft IntelliMouse™ to Move Around the Windows

MapInfo Professional 9.0 supports the Microsoft IntelliMouse™ as follows:

Document Scrolling: In the Map, Layout, Browser, and MapBasic windows, hold down the **Ctrl** key and move the wheel to scroll the document vertically; the effect is the same as clicking on the arrow at the end of the scroll bar.

Document Panning: In the Map and Browser windows, hold down the **Wheel** button on the IntelliMouse™ and move the mouse to pan the document. Release the button to end the panning. There are three panning speeds. The speed of the panning is based on the cursor's distance from the starting point, indicated by the origin mark. In the Map window, the distance moved at each speed is a percentage of the zoom distance.

For example, the amount to move at slow speed is. 005 * ZoomDistance, medium speed is. 01 * ZoomDistance, and super speed is .1 * ZoomDistance. In the Browser, the window is scrolled by 1, 3, and 7 lines or columns for slow, medium and super speeds. When the cursor is within 15 pixels of the starting point, there is no panning.

AutoScroll: In the Map and Browser windows, click and release the **Wheel** button to activate AutoScroll. When the mouse cursor is moved away from the starting point the document starts to scroll in whatever direction you move the mouse. When the cursor is returned to the starting point, scrolling stops. AutoScroll is turned off by any mouse click or key stroke. AutoScroll is also turned off when MapInfo Professional loses the focus, for example, when you **Alt-Tab** to another application.

Zoom: In the Map and Layout windows, move the wheel forward to zoom in on the document. Roll back the mouse wheel to zoom out on the document. The wheel has a series of settings; each "click" is the same as one click with a zoom tool. The mouse wheel does not recenter the view. There are other keyboard commands that allow you to zoom in and out more precisely.

Installing Global Positioning Software (GPS)

To install Global Positioning Software from Blue Marble:

1. From the CD menu, click **Install Products** and then **Free Utilities**.
2. Click **Install GPS Support**. You will be prompted to exit all applications before installing. Choose **OK**.
3. The MapInfo Special Edition dialog box displays. Choose **OK**.
4. The Select Destination Location screen displays. Specify the directory where GPS will be installed.
5. The Software License screen displays. Choose **YES** to accept the terms of the agreement and to continue the installation process.
6. The Add to the Start Menu dialog box displays: click **Yes** to add a shortcut to the **Start** menu.
7. The ReadMe displays; choose **OK** to exit the ReadMe.

Installing the Online References

MapInfo Professional 9.0 provides the following online reference documents: MapInfo Professional *Supplement*, MapBasic *Reference Guide*, Crystal Reports *User's Guide*, ArcLink, and EasyLoader documentation, as well as the Adobe Acrobat Reader. These documents are installed in the Documentation subfolder of your installation directory.

Note: If you have any questions about the use of the Acrobat Reader, contact Adobe support at www.Adobe.com.

Troubleshooting your Installation

The Installer must be run from a drive with a letter such as G: and not from an explicit UNC path. For example, you might have the MapInfo Professional CD in your computer as USERSPC. Other users may share this device as USERSPC; however, it would not contain a drive letter. The MapInfo Professional Installation program requires a drive letter.

To remedy this situation, map your network drive to a specific drive letter:

1. In Windows Explorer, right-click the shared directory or CD-ROM that contains the MapInfo Professional SETUP.EXE and select **Map Network Drive**.
2. Choose a drive letter to map.
3. Run the Installation Program again from the newly mapped drive letter.

Modifying or Removing MapInfo Professional

Use the Program Maintenance feature of the CD Browser to modify, repair, or remove MapInfo Professional.

To access Program Maintenance:

1. Click **Install Products** from the MapInfo Professional CD Browser.
2. Click **MapInfo Professional**. The Welcome screen displays. Choose **Next**. The Program Maintenance screen displays.
3. Choose modify, repair, or remove MapInfo Professional based on your needs.
   - Click **Modify** to display the Custom Setup dialog box.
   - Click **Repair** to repair installation errors in the program.
   - Click **Remove** to remove an existing copy of MapInfo Professional 9.0 from your system. The installer displays the Remove the Program dialog box. Click **Remove** to uninstall the product's programs from your system.

   You can also access the Program Maintenance screen from the **Start** menu by clicking **Control Panel** and then **Add/Remove Programs** and finally **MapInfo Professional**.

   For information on node-locked license transfer options at uninstall, see **Uninstall Transfer Options on page 101**

Controlling Advanced System Settings

MapInfo Professional has some advanced system settings that cannot be configured through a dialog box. These settings allow you to control several low-level, technical aspects of how MapInfo Professional runs. Most users do not need to worry about these advanced settings.

For example, MapInfo Professional has a Dynamic Data Exchange (DDE) time-out setting, which controls how long MapInfo Professional tries to communicate with other applications during DDE communications. If you run a MapBasic application, and that application encounters time-out errors during DDE, you may want to increase the DDE time-out setting. To modify one of MapInfo Professional's advanced system settings (such as the DDE time-out setting), use this procedure.

Modifying the Windows Registry

MapInfo Professional stores system settings in the Windows registry. To edit the Windows 2000 registry, use the REGEDT32 program.

CAUTION: **Be very careful when editing the registry; damaging the registry can cause serious problems in your operating system.**

For example, to set MapInfo Professional's Dynamic Data Exchange (DDE) time-out setting, locate the following key in the registry:

```
HKEY_LOCAL_MACHINE\SOFTWARE\MapInfo\MapInfo\Common
```

Within that key, edit the DDeTimeout value. If there is no value by that name, create a new value of type string, and assign the name DDeTimeout to the value. Set the value's data to be a number, representing the number of milliseconds (for example, enter 30000 to specify a time-out of 30 seconds). For more on editing the registry, see the online help for REGEDIT or REGEDT32.

Descriptions of Advanced Registry Settings

This section describes advanced settings that are stored in the registry.

DDeTimeout = *number*
This setting controls MapInfo Professional's time-out setting in DDE conversations where MapInfo Professional is the client (the application that initiates a conversation). The *number* represents milliseconds. The default value is 10,000 milliseconds (ten seconds). If you run a MapBasic application that attempts to initiate a DDE conversation, but the conversation fails because the server application does not respond within the time-out period, you may need to increase the DDeTimeout number.

OffscreenBitmap = *number*
The *number* is 0 (zero) or 1 (one). A value of 1 (the default) indicates that MapInfo Professional will process off-screen bitmaps when drawing a map. This means that if you cover a Map window, and then bring the Map window to the front again, the map redraws instantly. If you set this setting to zero, MapInfo Professional will not process off-screen bitmaps. This means that when you bring a Map window to the front, MapInfo Professional will redraw the map. If you are using a video driver that is problematic, and encounter video problems with Map windows, you may eliminate those problems by setting the OffscreenBitmap number to 0.

MaxFiles = *number*
This setting must be an integer from 10 to 100, indicating how many files MapInfo Professional can open simultaneously. This setting does not limit the number of tables you can open, but it does limit the number of tables you can edit at one time (the number of tables that have unsaved edits). The default value is 29. If you need to work with more files simultaneously, set *number* to 100.

MaxORACLETILES = *number*
A value from 0 = unlimited tiles to infinity.

Improving Performance for MapInfo Professional

To improve MapInfo Professional's performance, you can increase the speed of the processor in the machine. A video accelerator card will increase the speed of the redraw. It will not speed up the initial draw of the map, but all subsequent redraws will be faster. A faster disk cache will also improve performance, as will adding memory.

Controlling the Location of Application Data Files During Installation

By default, the setup program for MapInfo Professional installs application data files to locations that make sense for the typical user. After installing the product, the user is free to move one or more of the application data files to another predefined location and MapInfo Professional will find that file. For example, the administrator of a machine might move MAPINFOW.PEN from the per user area (its default location) into the install directory so all users on that machine will share the same set of pens. For IT personnel responsible for a large number of MapInfo Professional installs it is not practical to manually move application data files to realize the desired configuration.

To solve this problem, create a setting file, MODE.INI, to specify the location of application data files prior to installing MapInfo Professional.

1. Copy the installation files to a read-write location.
2. Create a MODE.INI file in the root directory of the installer.

Code	Description	Location
1	per user, roaming	<Current User>\Application Data
2	per user, not roaming	<Current User>\Local Settings\Application Data
3	per machine	<All Users>\Application Data
4	program directory	<Install Dir>

3. Open MODE.INI into any text editor.
4. Edit MODE.INI, modifying the code associated with the application data file/folder whose location you wish to change.
5. Install MapInfo Professional.

The following is a list of predefined locations for application data files supported by MapInfo Professional, and the corresponding numeric code to be used in MODE.INI.

The following is a list of application data files/groups and their default locations:

Filename	Default Location
MAPINFOW.CLR	per user, roaming
MAPINFOW.PEN	per user, roaming
MAPINFOW.FNT	per user, roaming
MAPINFOW.ABB	program directory
MAPINFOW.PRJ	program directory
MAPINFOW.MNU	program directory
CustSymb	per user, roaming
ThmTmplt	per user, roaming
GraphSupport	per machine

MODE. INI File Example

Create a text file with the following syntax:

```
GraphSupport = 3
CustSymb = 1
ThmTmplt = 1
MAPINFOW.CLR = 1
MAPINFOW.FNT = 1
MAPINFOW.PEN = 1
MAPINFOW.ABB = 4
MAPINFOW.PRJ = 4
MAPINFOW.MNU = 4
```

Removing MapInfo Professional from your System using Control Panel

Remove MapInfo Professional by accessing the CD Browser, Program Maintenance screen, or by choosing the Add/Remove Programs option in the Control Panel in Windows 2000 or Windows XP.

- For more information, see *Removing MapInfo Professional from your System using the CD Browser* in the *Help System*.

Configuring the MapInfo Professional Preferences

Preferences allow you to change a number of default settings, enabling you to customize certain aspects of the program's behavior. Preference files are stored on a per-user basis. As you gain experience with MapInfo Professional®, you will probably want to change some of these settings. This chapter discusses the various preferences and what they control.

Here is a brief description of the preference categories:

System Settings – Controls what information is copied to the clipboard, color defaults, aspect ratio, paper and layout units, the number of Undo objects permitted, how symbol types used prior to version 4.0 are drawn, and how MapInfo Professional handles 2-digit years.

Map Window – Sets the default Map window options; moving duplicate nodes; snap tolerance; units for distance and area; display of scroll bars in the Map window; display of degrees in either decimal or degrees, minutes, seconds form; and the display of InfoTips.

Layout Window - Sets the Layout window preferences to display Rulers, Page Breaks, and to determine the display options of frame contents.

Legend Window – Sets the legend frame default settings.

Startup – Controls whether the program saves the MAPINFOW.WOR upon exiting and loads it upon start up; whether queries are saved in workspaces; and the display of the Quick Start dialog box upon startup.

Address Matching – Controls the house number placement when specifying street addresses.

Directories – Specifies default directories for opening and saving tables, workspaces, MapBasic programs, import files, ODBC SQL queries, theme templates, graph support files, saved queries, new grids, and Crystal Report files. Also specifies the directories MapInfo Professional searches for tables without fully qualified paths referenced in workspaces or MapBasic programs.

Output Settings – Controls the on-screen display of a raster file, the printer output, and exporting choices.

Printer – Controls which printer information is used for all new windows. This printer can be the Windows default printer, or a printer you designate as your MapInfo Preferred printer. This choice can be overridden on a per window basis using either the Print or Page Setup dialog boxes.

Styles – Sets the default object styles for region, line, symbol, and text objects.

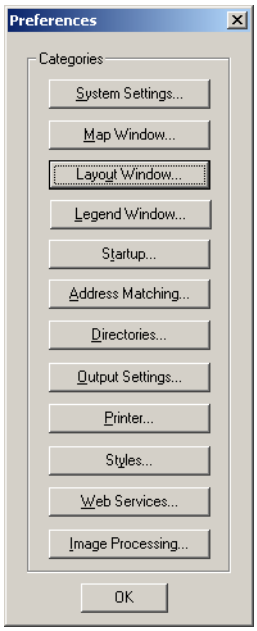
Web Services – Sets refresh, timeout values, server options and other default settings for Proxy Servers, WMS, WFS, Geocode Servers, and Drivetime server web services.

Image Processing - Sets the rules for raster reprojection allowing you to choose whether reprojection is allowed, when, and allows you to select resampling options.

Setting the Preferences

To set a preference:

1. On the **Options** menu, click **Preferences** to display the Preferences dialog box.



2. Click one of the preference buttons to display the specified preferences dialog box.
3. Set your preferences in that dialog box and click **OK** to save them and return to the Preferences dialog box.
4. Click **OK** to close the Preferences dialog box.

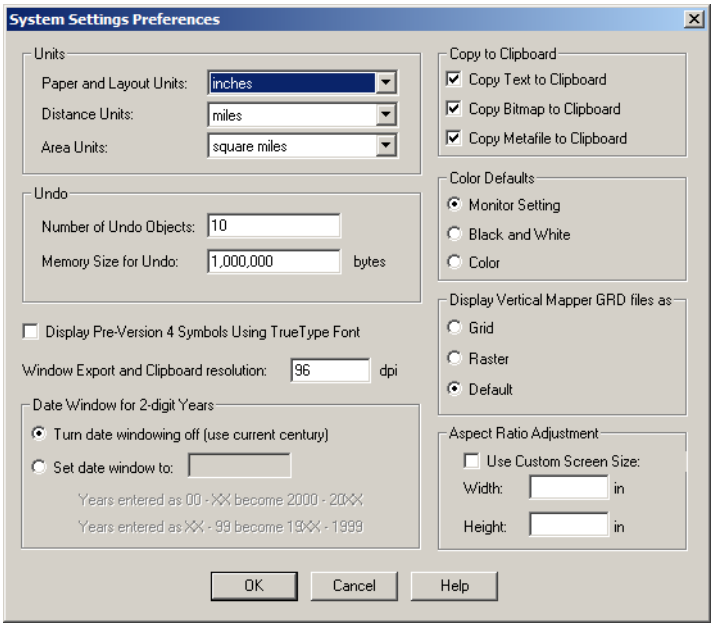
What follows in this section are details to assist you in setting your preferences.

Setting your System Preferences

Use the System Settings Preferences dialog box to control the default settings that affect how MapInfo Professional interacts with your system.

To set your system settings preferences:

1. On the **Options** menu, point to **Preferences** and click **System Settings** to display the System Settings Preferences dialog box.



2. Select the appropriate system preferences for your implementation of MapInfo Professional. Click **OK** to save them.

Setting the Units

- **Paper and Layout Units** — Specify the Paper and Layout Units used when you measure the size of objects in a **Layout** window and the size of paper in the Print dialog boxes. The default is set to inches. You can choose: inches, picas, points, millimeters, and centimeters.
- **Distance Units** — Specify the units that you want to use to indicate distance in the application by selecting **US Survey feet, yards, rods, chains, miles, nautical miles, millimeters, centimeters, meters**, or **kilometers**.
- **Area Units** —Specify the area units you want to use in the application by selecting **square inches, square links, square feet, square yards, square rods, perches, square chains, rods, acres, square miles, square nautical miles, square millimeters, square centimeters, square meters, hectares**, or **square kilometers**.

Copying to the Clipboard

- **Copy Text/Bitmap/Metafile to Clipboard** — Click the **Copy to Clipboard** check boxes to specify whether to copy text, bitmap, and metafile items to the Clipboard. All three are copied to the Clipboard by default. Clear the appropriate check box(es) to prevent the item from being copied to the clipboard.

Setting the Undo Options

- **Number of Objects** — You can only undo the last action. Set this option to the number of objects in the last action you want the system to undo. For example, if you moved 10 objects at the same time and enter 10 in this field, MapInfo Professional restores all 10.

Note: You cannot use the Undo capability for the following operations: Revert, Save, Save As, or Modify Table, or any operations whose effects are primarily cosmetic.

The default is 10 objects. You can set it from 0 to 800. Setting the number of objects to 0 deactivates the system. After you use the Undo option, the system toggles to **Redo**.

- **Memory Size for Undo** — Type the number of bytes of memory you want to set aside for the Undo feature. This entry is set to 1,000,000 bytes by default. You can enter up to 10,000,000 bytes into this field. Increasing this entry may result in slower response time.

Setting the Color Defaults

Select one of the Color Defaults preferences described below to control how MapInfo Professional shades thematic map layers.

- By default, **Monitor Setting** is selected. MapInfo Professional uses the color settings of the monitor to shade the map when this option is selected.
- Click the **Black & White** radio button if you are using a color monitor and want to shade your thematic map in gray-scale.
- Click the **Color** radio button if you are using a black and white monitor and want to print a thematic map in color on a color printer.

Display Pre-Version 4 Symbols using the True Type font — Select this check box to indicate how you want to draw symbols from early versions of MapInfo Professional (before 4.0). Select this check box to draw vector symbols with characters from the MapInfo Professional Symbols font. By default, vector symbols are drawn.

Window Export and Clipboard Resolution — To set the image resolution for exporting and Clipboard purposes, type the resolution in this field. MapInfo Professional uses this preference whenever you copy windows to the Clipboard, export your work to metafile and raster formats and the Save Window As export process as well. If you do not set this resolution manually, the product assumes 96 DPI. The maximum setting for this field is 1200 DPI.

Display Vertical Mapper grd files as — Use this option to determine how to display Vertical Mapper GRD files within MapInfo Professional. These options allow you to display your Vertical Mapper GRD maps as grid files and not as raster files. Vertical Mapper creates GRD\TAB files that display using the raster handler. This preference contains a Grid option, so that Vertical Mapper grid files use the Info tool and displays file information in 3D windows.

- Click **Grid** to display GRD files as grid files and get the added support of the MapInfo Professional toolbar features.
- Click **Raster** to display the GRD files as raster images.
- Click **Default** to treat the GRD files as rasters or grids depending on existence of the Rasterstyle 6 1 code in the TAB file. If the code does not exist, the file opens as a raster file, if the code does exist, the file opens as a grid file.

Date Window for 2 Digit Years — Select the appropriate Date Window for 2-Digit Years option for your purposes:

- Click the **Turn date windowing off** radio button to use the current century for all 2-digit years. This option is selected by default.
- Click the **Set date window to** radio button to refer to dates in both the current century and the previous century. You need to use this setting if your data uses dates in the 1900s.

  For example, if you type the number 30 in the **Set date window** field, 2-digit years from 00–29 are set in the 21st century (2000-2029), and 2-digit years from 30–99 are set in the 20th century (1930-1999).

Setting the Aspect Ratio Adjustment

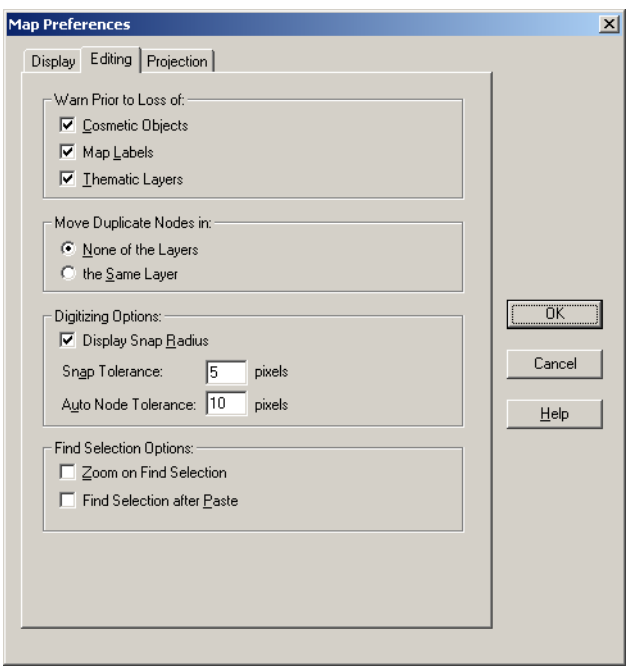
- **Aspect Ratio Adjustment** — Select the Aspect Ratio Adjustment options so that your map maintains the appropriate aspect ratio on your screen. Enter the dimensions of your screen in these fields.

Setting your Map Window Preferences

The Map window preferences control the default settings for any new Map window created in MapInfo Professional. You can override some of these preference settings for the current Map window in the Map Options dialog box (on the **Map** menu, click **Options**). These include the settings for resizing Map windows, specifying distance/area calculations, and displaying coordinates in degrees, minutes, seconds.

To set the Map Window preferences:

1. Choose **Options** > **Preferences** > **Map Window** to display the Map Preferences dialog box.



2. In the Display tab, select from these options:

- Set the **When Resizing Map Window** options to control the default behavior of Map windows when you resize them. Select one of these options:
  - Click the **Fit Map to New Window** to draw the map to fit the resized window. You see the same view of the map that you saw before you resized the window. This is the default setting.
  - Click the **Preserve Current Scale** button to change the view of the map when the Map window is resized. As you shrink or enlarge the window, you will see a smaller or larger area of the map.

  This setting does not affect Map windows that are already open. To override the preference settings for the currently open Map window, make different selections in the Map Options dialog box.
- Select the **Apply Clip Region Using** settings to specify how you want the product to clip regions. Select one of these three choices:
  - **Windows Device Clipping (all objects)** – The clipping is controlled by the Windows Device Display. All objects (including points, labels, text, raster and grid images) will be clipped at the Clip Region boundary. This is the default setting.
  - **Windows Device Clipping (no points, text)** – Use this method to emulate the Erase Outside clipping method. All objects are clipped using Erase Outside except points and labels. Points and labels will be completely displayed only if the point or label point lies inside the Clip Region object. Text objects, raster files, and grid files always display and are never clipped.
  - **Erase Outside (no points, text)** – This method uses the Erase Outside functionality. The Clip Region object is the Cutter object, and all other objects are Target objects for this operation. All objects are clipped using Erase Outside, excepts points and labels. In addition, points and labels will be completely displayed only if the point or label point lie inside the Clip Region object. Text objects always display and are never clipped.
- Other display options include
  - **Scrollbars** — To display scrollbars, select the **Scroll Bars** check box. By default, MapInfo Professional does not display scrollbars in Map windows.
  - **Autoscroll** — To scroll the layout automatically, select the **Autoscroll** check box.
  - **Show InfoTips** — To display one or two word tips when you cursor over a button, select the **InfoTips** check box. By default, MapInfo Professional displays InfoTips. Clear the **Show InfoTips** check box to deactivate their display.
  - **Show ToolTips in Layer Control Dialog** — To display detailed layer information in the Layer Control dialog box, select this check box. If you do not want to see this level of detail, clear this check box.
  - **Automatic Raster Zoom Layering** — To choose the default mode for automatic zoom layering for raster layers, select this check box. Raster zoom layering is turned on by default.
  - **Automatic Grid Zoom Layering** — To choose the default mode for automatic grid zoom layering when adding a grid layer to the map, select this check box. Automatic Grid Zoom Layering is turned off by default.
  - **Use Cartographic Scale** — To display your maps in Cartographic Scale automatically. When you make this change, the options that display in the Change View, Map Print Options and Frame Object dialog boxes use the cartographic scale on which the selected map is based and a scale indicator displays in the Status Bar.
  - **Draw Layers Under Themes** — This option sets the default behavior for the **Replace Layer Style** check box in both the Ranges and Individual Value Theme dialog boxes. Select this

check box to clear the **Replace Layer Style** check box by default. Clear this check box to select the **Replace Layer Style** check box by default.

- **Automatically Open Default Theme** — This option saves the theme to the table's metadata so that the theme displays each time you open the table. This check box is cleared by default.
- **Enable Hardware Acceleration for 3DMap Windows** — Select this check box to use your video card acceleration capability to display 3DMaps. Clear the box to display the 3DMap without using your video card acceleration capability. Turning the acceleration off reduces performance, but it avoids failure with certain graphic adapters and drivers.
- **Handler for New Grids** — Select the output grid file format. By default, MapInfo Professional uses the MapInfo Professional handler (*.MIG). The available formats depend on which grid handlers are installed. When you change the grid file format, the file extension on the grid file name changes to reflect the selected format.

3. In the Editing tab, select from these options:

- Set the **Warn Prior to Loss** options to display warning messages before you leave the currently open map window and lose cosmetic objects, map labels, and thematic layers you have created. After the warning, you can save these objects, labels and layers as part of a table or workspace. These boxes are selected by default.

  You can turn off the display of these warning messages by clearing the desired check boxes from the Warn Prior to Loss of group.
- Select the **Move Duplicate Nodes in** settings to specify whether MapInfo Professional will move duplicate nodes when you use the **Reshape** command (on the **Edit** menu, click **Reshape**) to edit objects that are adjacent to each other, such as regions. Select one of these options:
  - Select the **None of the Layers** button to prohibit the product from moving duplicate nodes. This is the default setting
  - Select the **Same Layer** button to move duplicate nodes that are in the same layer when one of the connected nodes is moved.
- Digitizing Options include:
  - **Display Snap Radius** — Select this option to set the **Snap Tolerance** and **Auto Node Tolerance** to make the snap radius larger or smaller. If you clear the **Display Snap Radius** option**,** the radius does not display when the snap mode is turned on.

  Type the appropriate **Snap Tolerance** and **Auto Node Tolerance** settings to specify the default tolerance in pixels within which Snap to node and Auto Node features operate. You use these settings when you draw objects (click the **S** key to turn Snap to node on). The default is 5 pixels. Enter a smaller value to obtain a tighter tolerance, and avoid snapping to other objects' nodes as you draw. Enter a larger value to obtain a looser tolerance, when you want to snap to a node even though you are relatively far away from it.

  For more information about Snap Tolerance, see *Using "Snap To" to Select Nodes and Centroids* in the *Help System*.
- Find Selection Options include:
  - **Zoom on Find Selection** — Select this option to zoom to the selection each time you perform a Find Selection for single and multiple objects. Clear this check box to prevent zooming when performing a Find Selection.
  - **Find Selection after Paste** — Select this option to turn on the Find Selection feature in the Map window only after you Paste an object. If you have an active Browser, and the selection

is in that Browser window, the browser still scrolls to the selection. Clear this check box to prevent zooming after pasting an object.

4. In the Projection tab, select from these options:

   - **Table Projection** — To set the default projections for the current map, designate a default table projection for creating new tables, importing GML 2.1, MIF, MBI, and IMG files, and for **Choose Projection** options in dialog boxes.

   Note: You can override the table projection defaults by accessing the **Choose Projection** button throughout MapInfo Professional except when you use the Universal Translator, ArcLink, or when you import DXF files.

   - **Session Projection** — To set the option to designate a default MapBasic projection for returning coordinate values using a MapBasic window or Update Column. Compiled MapBasic applications are not affected by this preference.

- To change the format in which coordinates display, select one of the options in the Display Coordinates group. You can select only one:

  - **Decimal Degrees** — By default, MapInfo Professional displays coordinates in decimal degrees. MapInfo Professional displays coordinates of objects in the Object Info dialog boxes, and of the cursor location in the status bar if that display option is selected.
  - **Degrees, minutes, se**conds — Choose this option to display your Map using the degree, minute, seconds format.
  - **Military Grid Reference System** — Choose this option to display your Map using the Military Grid Reference System format. Coordinates are converted to the Military Grid Reference System format using the World Geodetic System (WGS) of 1984 Ellipsoid.

    To override this preference in individual maps, use the Map Options dialog box (on the **Map** menu, click **Options**). Overrides to the default coordinate setting will be saved to your workspace.

    Selected in either the Map window preferences or the Map Options dialog boxes, the format will display in the status bar, but not in the Object Info dialog boxes. If you display any Object Info dialog box for an object on a map that uses the Military Grid Reference System, the coordinates will be displayed in decimal degrees.

5. Select the **Distance/Area using** settings to specify the default type of distance/area calculation that MapInfo Professional uses for new Map windows.

   - **Spherical** — The Spherical calculations measure distance according to the curved surface of the Earth. **Spherical** is the default. The data is first converted to Latitude/Longitude and then a calculation is produced. Lat/Long data will always use spherical calculations.
   - **Cartesian** — The Cartesian method performs calculations on data projected onto a flat plane. Cartesian coordinates (x,y) define the position of a point in two-dimensional space by its perpendicular projection onto two axes which are at right angles to each other. Long/Lat projections cannot use Cartesian calculations.

   Note: To specify a calculation method for the currently active Map window, use the Map Options dialog box (on the **Map** menu, click **Options**).

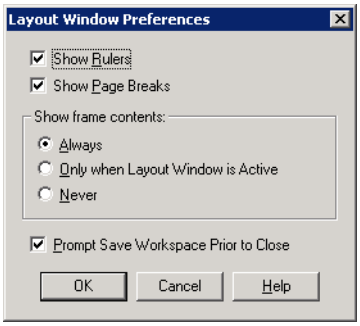
6. Click **OK** to save these settings and return to the Preferences dialog box.
7. Click **OK** to close the Preferences dialog box.

- For more information, see *Scrolling through a Map*, *Specifying Options in a Map*, *Changing the Default or Preference Setting for Calculations, Centering a Map Using Military Grid Reference System (MGRS) Coordinates*, and *Setting Default Clip Region Options* topics in the *Help System*.

Setting your Layout Window Preferences

To set the global default preferences for Layout windows:

1. Choose **Options > Preferences > Layout Window** to display the Layout Window Preferences dialog box.



Use this dialog box to set the preferences for Layout windows. Completing the entries in this dialog box ensures that your layouts will have a uniform look and feel.

2. Complete the selections in this dialog box and click OK to save your Layout window preferences.

Show Rulers

Select this check box to display rulers in your Layout window. Rulers can be useful to help you line up elements of your layout on the page. This option is selected by default.

Show Page Breaks

Select this check box to display the page breaks in your Layout window. Showing the page breaks ensures that the elements of your layout are consistent from page to page. This option is selected by default.

Show Frame Contents

The options in the Show frame contents box allow you to specify when the contents of frames display.

Always

Allows you to have the contents of a frame display all the time even when it is not active.

For example, if you are changing the contents of a Map window that is also in the layout, you might want the **Always** option. That way you can see the effect of the layout as you make your changes. This option is selected by default.

Only when Layout window is active

Allows you to display the contents of a frame only when the Layout is the active window.

Never

Allows you to display only the file name and frame type, even when the Layout is the active window. For example, choose **Never** when you are resizing and repositioning frames. That way the contents of each frame will not redraw every time you make a change.

Prompt to Save Workspace Prior to Close

When this check box is selected, MapInfo Professional prompts you to save before you close windows with layout changes. Clear this check box if you do not want to be prompted to save your changes. This option is selected by default to prevent accidental loss of information.

Note: The prompt only displays if there are changes to the open Layout and Legend windows or when the Layout and Legend windows are new.

3. Click **OK** to save your preference.

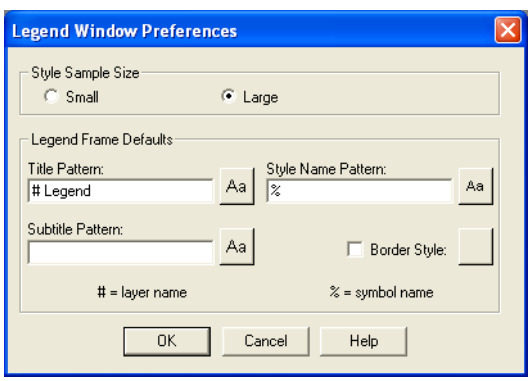
Once you set these preferences, MapInfo Professional sets these options automatically whenever you create a new Layout window. To reset these options for a particular layer locally, select **Layout > Options** to display the Layout Display Options dialog box. This dialog box also allows you to set height and width restrictions and an autoscroll option.

Setting your Legend Window Preferences

These settings control the defaults for how titles are specified for all legend frames in the legend window, as well as the default text style attributes such as font and size. The settings correspond to the settings displayed in Step 2 of the legend wizard. MapInfo Professional uses these defaults if there are no metadata keys in the table on which the legend frame is based. If metadata keys are present, the metadata defaults override the settings in Step 2 of the wizard and the Legend Preferences.

To set the Legend window preferences:

1. On the **Options** menu, point to **Preferences** and click **Legend Window** to display the Legend window preferences.



2. Use the options in this window to set the **Legend Frame Defaults**.
   - To set the **Title Pattern**, type the text that you want to display at the top of each legend frame in this box.

By default, the **Title Pattern** is "# Legend", where '#' is the name of the layer on which the frame is based. So, if the frame is based on the States layer, the default pattern title would be "States Legend." You can change this pattern to "Legend of #" or simply "#." To have no default pattern, leave the box blank.

Choose a title pattern default that suits your needs. The # character can be used in any of the pattern text boxes as a shortcut key for the layer name.

- To set the **Subtitle Pattern**, type the subtitle text you want in this box. The entry in this box is blank by default, but you can set your own default title pattern for subtitles.
- To set the **Style Name Pattern**, type the text you want to display beside each symbol in this box. The default pattern is the '%' character. The Style Name is the text that describes each symbol in a legend frame. The % character is used as a placeholder for the type of object the legend symbol corresponds to: point, line, or region.

  You can type in your own default **Style Name Pattern**, either using the % character or not. For example, in a legend frame based on the States layer, a Style Name Pattern that reads "% of #" will display as "Region of States" next to the symbol in the legend. The % character can only be used in the **Style Name Pattern** box.
- To set the **Border Style**, select this check box to place a border around the legend and select the appropriate style by clicking the **Border Style** button.

3. To change the defaults of the style attributes for the titles, the style name, or the legend frame border, click the desired style box to display the corresponding style dialog box and make your changes.
4. Click **OK** to save these settings and return to the Preferences dialog box.
5. Click **OK** to close the Preferences dialog box.

Text Box Size Limits

MapInfo Layout or Mapper windows can contain a maximum of 2047 characters. Text object rotation is restricted to under 256 bytes. Y are restricted to 256 bytes.

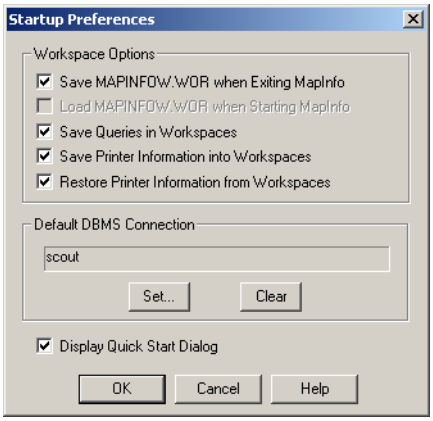
Setting the Startup Preferences

In general, the Startup preferences control:

- How MapInfo Professional behaves when you startup
- The MAPINFOW.WOR workspace properties such as whether printer information and queries are saved to workspaces

To set your startup preferences for MapInfo Professional:

1. On the **Options** menu, point to **Preferences** and click **Startup** to display the startup preferences.



2. Select the following boxes to enable the indicated functionality; clear the check box to disable this functionality. You may select all that apply.

   - **Save MAPINFOW.WOR when Exiting MapInfo** — Select this check box to save your setup to the MAPINFOW.WOR workspace when you exit MapInfo Professional. When you clear this check box, MapInfo Professional does not save the MAPINFOW.WOR unless you save it explicitly.
   - **Load MAPINFOW.WOR when Starting MapInfo** — Select this check box to display MAPINFOW.WOR when you enter MapInfo Professional.

   Note: To enable this check box, you must clear the **Display Quick Start Dialog** check box.

   - **Save Queries in Workspaces** — Select this check box to save the queries you create during a mapping session in the workspace. If you do not select this check box and the selected map has only one layer based on a query, the query is not saved and the application writes a map definition with an empty layer list. MapInfo Professional cannot support subselects in queries. The operators Any and All are not supported in the MapXtreme 2004 versions of MapInfo SQL and, therefore, subselects are not supported either.

   Note: MapInfo Professional cannot map selections with Group Bys, so Group By clauses are ignored. MapInfo Professional only translates the Order By clause.

   - **Save Printer Information into Workspaces** — Select this check box to save the printer information in the workspace.

     This check box saves the printer name, paper orientation, paper size, and the number of copies from your printer settings into the workspace. This also includes any overrides you might have made to the default printer settings in the Printer preferences. We recommend that you leave this preference on.

   - **Restore Printer Information to Workspaces** — Select this check box to restore printer information from a workspace. When you open the workspace, the printer name, paper orientation, paper size, and the number of copies are restored. This is useful if you are

sharing workspaces with other MapInfo Professional (6.0 or later) users who are also using the same printers.

Note: If this preference is turned off, or if the printer indicated is not available, the printer settings for the workspace revert back to the default printer set in the Printer preferences.

- **DBMS Connection** — Select this check box to save a default DBMS Connection, specify a DBMS connection that will be opened each time you begin a MapInfo Professional session. Click **Set** to set this connection.
- **Display Quick Start Dialog** — Select this check box to display the Quick Start dialog box automatically when you start MapInfo Professional. This check box is selected by default. Clear the **Display Quick Start Dialog** check box to prevent it from displaying when you start subsequent MapInfo sessions.

3. Click **OK** to save these settings and return to the Preferences dialog box.
4. Click **OK** to close the Preferences dialog box.

To set default DBMS Connections, see *Setting up your Database Connection Preferences* in the *Help System*.

Creating a Startup Workspace

STARTUP.WOR is the name you give to a workspace from which MapInfo Professional is run. You can create it so that MapInfo Professional automatically opens various tables and windows on startup. When you use STARTUP.WOR, MapInfo Professional performs the startup actions regardless of what you did in your previous MapInfo Professional session or how you have set preferences for MAPINFO.WOR.

To create a workspace:

1. Open the tables and windows you want in your workspace. Size and position them as you please.
2. Choose **File > Save Workspace**.
3. Name your workspace "`Startup`" and save the workspace into your "home" directory. By "home" directory we mean your private Windows directory.

When you run MapInfo Professional, MapInfo Professional does the following in the order shown:

- If there is a STARTUP.WOR in the MapInfo Professional program directory, it is run.
- Then, if there is a STARTUP.WOR in your home directory it is run. (When there is a STARTUP.WOR in both the MapInfo Professional program directory and your home directory, both will= run.)
- Then, if any file names are given on the command line—or if you double-click a document, MapInfo Professional loads those files. MapInfo Professional support adding workspaces (.WOR), running applications (.APP), and opening databases (.TAB) on the command line.
- Only if MapInfo Professional did not add a workspace or run a program from the command line does it then check the AutoLoad preference and load MAPINFOW.WOR from the user's home directory. When the preference is set, and the file is found, it is loaded. Note that if we had a workspace or application on the command line, we skip the AutoLoad.
- Finally, if MapInfo Professional didn't load a workspace or run an application from the command line, and it didn't AutoLoad MAPINFOW.WOR, then MapInfo Professional shows the Tool palette.

Setting your Address Matching Preferences

Use the Address Matching preferences to specify the placement of the house number in addresses. The default setting is for house numbers to come before the street name.

To set your address matching preferences:

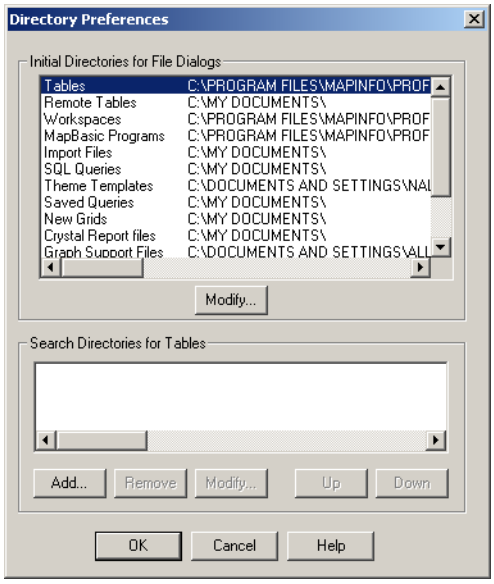
1. On the **Options** menu, point to **Preferences** and click **Address Matching** to display the Address Matching Preferences dialog box.
2. Click **OK** to save this preference and return to the Preferences dialog box.
3. Click **OK** to close the Preferences dialog box.

Setting your Directory Preferences

The Directory preferences control the directories in which MapInfo Professional looks for files.

To set your directory preferences:

1. On the **Options** menu, point to **Preferences** and click **Directories** to display the Directory Preferences dialog box settings.



2. To set a preferred directory for each type of file, highlight the file dialog type and click the **Modify** button. The Choose Directory dialog box displays.
3. Select the appropriate directory for the file type you highlighted and click **OK**.
4. Repeat this process until you have specified all of the directories you need to.
5. Click **OK** to save these settings and return to the Preferences dialog box.
6. Click **OK** to close the Preferences dialog box.

Use this setting to specify the default directories that display in the File menu dialog boxes when you open or save different files. You can specify directories for:

- Tables
- Remote tables
- Workspaces
- MapBasic programs
- Import files
- DBMS SQL queries
- Theme templates
- Saved queries
- New grids
- Crystal Report files
- Graph support files
- Shapefile tables

When you click **Open**, you can select an icon from the MapInfo Places Bar. Click the **Workspace Directory** icon to display the workspace directory you designated in this preference.

Additionally, use this preference to search for raster and grid tables. If you open a *.tab file for a raster or grid image and the image file cannot be found an attempt is made to find the image in the same location as the .TAB. If the image file is not found, it will then use the Search Directories.

Use the Search Directories for Tables and Workspaces to specify search paths that MapInfo will use to look for tables referenced in workspaces or MapBasic programs that do not have fully qualified paths.

To search directories for tables and workspaces:

1. To specify a search path, in Search Directories for Tables group, click **Add**.

   Note: You can use the **Add** and **Remove** buttons to add or remove paths from the list.

2. Specify a drive and directory in the Choose Directory dialog box and click **OK**.

   You can set up to four paths. Use the **Up** and **Down** keys to change the search order.

3. Click **OK** to save these settings and return to the Preferences dialog box.
4. Click **OK** to close the Preferences dialog box.

- For more information see *Choosing the Directories in the Place Bar* in the *Help System*.

Setting your Output Setting Preferences

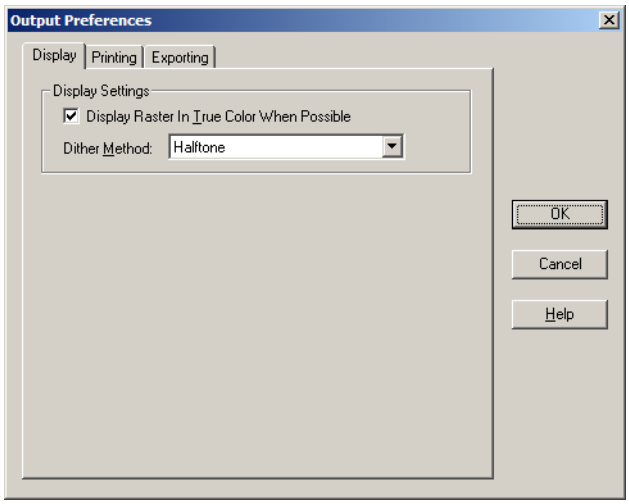
The Output Settings allow you to control raster and grid file color settings for on-screen display, printed output, and file export settings. In addition, you can also specify how you want to handle transparency in vector and raster files in both your printed output and exported files. Other printer settings enable you to specify an output method, map scaling, and whether to print a border around a Map window.

You can override the settings in the Output settings preferences in the Advanced Printing dialog box. These preferences represent the default settings used in the Advanced Printing dialog box. These settings can then be saved in a workspace.

Note: You can get additional printer advice in the MapInfo Professional *Printing Guide* in the Documentation subfolder of your installation directory.

To set your output preferences:

1. On the **Options** menu, point to **Preferences** and click **Output Settings** to display the Output Preferences dialog box.



2. The **Display** tab sets the on-screen display options for raster or grid files. Click the appropriate output settings based on your output requirements.

   These entries explain the display settings, the printing options, and window export options in this dialog. Some of the options appear in more than one dialog so we have grouped all of the like explanations together.

   - **Display Raster in True Color When Possible** — Click this check box to display your 24-bit raster or grid file images in true color (make sure your display settings are set to greater than 256 colors). Clear this check box if you only want your images to display using 256 colors. This box is checked by default.
   - **Dither Method** — Dithering is a technique that blends pixels electronically to improve the look of an image. Click a dither method when you are converting a 24-bit image to 256 colors.

     Dithering creates the illusion of complex colors by using a pattern of finite (fixed) color dots. For example, to create the color green using dithering, the color would consist of a pattern of yellow and blue dots.

     Halftone dithering calculates a series of half tone differences in color between high- contrast elements in your image to create a smooth transition of color. This option is selected by default for display, print, and export options.

     Error diffusion dithering calculates an interim color between contrasting colors and shades the surrounding pixels to blend evenly toward that interim color.

Note: You can select dither method options in the display, printing, and exporting sections of this dialog box. The same definitions apply to each area.

3. Click the **Printing** tab to set the printing options for Map windows, Layout windows and all other output file types. Select the appropriate printing settings based on your output requirements. Remember that resetting these printer options locally overrides these preferences.

   - **Output Method/Print Directly to Device** — Click this option to print your image file directly from MapInfo Professional as you did when you were using MapInfo Professional 6.0 or earlier. This check box is checked by default.
   - **Output Method/Print Using Enhanced Metafile** — Click this option to generate an enhanced metafile of your MapInfo Professional image before sending it to the printer. This setting takes advantage of current printer technology to shrink the spool size and print your file quicker without sacrificing quality.

   Note: You must use this setting if you are printing a map containing a translucent raster or grid layer. If you do not use this setting, the image will not print translucently.

   - **Print Border for Map Window** — Click this check box to print a black border around the image you are printing. Clear this check box to leave the image unbordered. This check box is checked by default.
   - **Internal Handling for Printing Transparent Vector Fills and Symbols** — Special programming has been added to handle transparent fill patterns and bitmaps for vector images when printing or exporting. Click this check box to use this functionality or clear it to let the printer or Windows export functions to handle this. This check box is checked by default.
   - **Scale Patterns** — Select this check box to match the non-transparent fill patterns in your print output to more closely match what you see on your screen. This check box is checked by default. Clear this check box to let the printer driver have exclusive control over rendering the pattern fills.

   Note: The **Scale Patterns** check box does not affect transparent fill patterns because transparent fill patterns are always scaled.

   - **Use ROP Method to Display Transparent Raster** — Click this check box to allow the internal ROP (Raster Overlay by Pixel) to manage the transparent pixel display and printing in raster images. Since the ROP Method is largely a display method, not all printers, plotters, and export programs can use it. We recommend that you either check with the printer manufacturer before using this setting or try a few test prints or exports to get the results you want. This check box is cleared by default.

     Using the ROP method may not produce problems unless you print the metafile.

   - **Print/Export Raster in True Color When Possible** — Click this check box to print and export your 24-bit raster or grid file images in true color (make sure your printer settings are set to greater than 256 colors). Clear this check box if you are not working with a color printer. This check box is checked by default.

   Note: See the Dither Method setting above for details about this option.

4. Click the **Exporting** tab settings to set the export options for Map windows, Layout windows and all other output file types. Select the appropriate window export settings based on your output requirements. Remember that resetting these options locally overrides these preferences.

- **Export Border** — Select this check box to include a black border on images you are exporting. Clear this check box to export the image without a border. This check box is checked by default.

Note: The preference setting definitions for Internal Handling for Transparent Vector Fills and Symbols, Use ROP Method to Display Transparent Raster, Print Raster in True Color When Possible, and Dithering Methods are the same for export as for printing.

- **Use Anti-Aliasing**— Select this check box to apply the anti-aliasing options available in MapInfo Professional.

5. Click **OK** to save these settings and return to the Preferences dialog box.
6. Click **OK** to close the Preferences dialog box.

Understanding the Anti-Aliasing Export Preferences

To give you more control over map images when exporting MapInfo Professional maps, you can use anti-aliasing methods. This is particularly important when you are saving maps created in MapInfo Professional for use in other Windows-based applications, in particular in slide presentations or for web pages.

The benefits of anti-aliasing can include:

- Make your fonts look smoother
- Make jagged edges in maps look rounder
- Can make text can be easier to read (for some) because it looks more like printed type
- Make maps look more visually attractive

We have added the ability to smooth images and text during the export process. You can use this capability with all types of windows such as Map windows, layouts, legends, and graphs.

Note: You cannot anti-alias images you are exporting to .EMF or .WMF format, because these are not true raster formats.

There are three smoothing options you can use to customize your raster image:

1. *Smooth using a Filter value*. You can set a flag that selects one of six filters that allow you to choose the direction the filter is applied to the image from.
2. *Smooth using a Mask value*. You can select a value that indicates the size of the area you want to smooth. For example, to create a 3x3 pixel mask value, you would enter a 3 in this field. This would limit the amount of change in the color of the pixels. Typically mask sizes would be 2-3 pixels when exporting at screen resolution. If you are exporting at a higher resolution, a larger mask might be appropriate.
3. *Smooth using a Threshold value*. You can select a threshold value to indicate which pixels to smooth. Each pixel in an image has a value based on its color. The smaller the pixel value, the darker the color. Select this option to smooth all of the pixels above the threshold you enter in this field. When you set this value to 0, MapInfo Professional will smooth all of the pixels.

You must either set a global preference for these anti-aliasing options or set them locally during the export process (using the Advanced button).

- For more information, see *Recommendations for Effective Pattern Scaling* in the *Help System*.

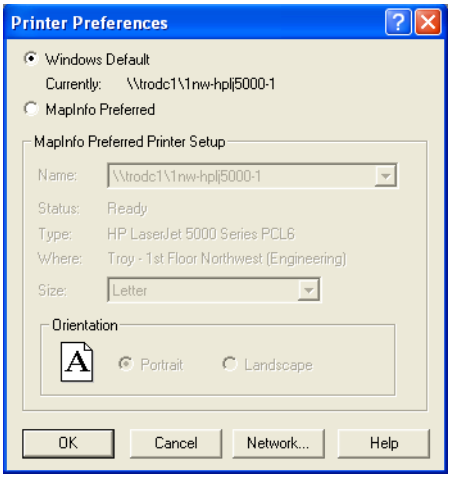
Setting the Printer Preferences

You can use the printer preferences to select a printer for MapInfo Professional output, which can be separate from your default Windows printer.

Note: You can get additional printer advice in the MapInfo Professional *Printing Guide*, which is located in the Documentation subfolder of your installation directory.

To set your printer preferences:

1. On the **Options** menu, point to **Preferences** and click **Printer** to display the Printer Preferences dialog box.



2. Complete your selections using these instructions.
   - **Windows Default** — This entry displays the path to the default printer specified for your operating system. This button is selected by default.
   - **MapInfo Preferred** — Click this button to select a different default printer when printing while using MapInfo Professional. This can be a printer or a plotter. After you select this option you can specify the size of the paper that is appropriate for this printer.
   - **Size** — After you select a printer, this list prefills with the appropriate paper sizes available. Select the requested paper size from this drop-down list.
   - **Orientation** — After you select a printer, you can specify the direction that the paper faces. Portrait indicates that the paper is taller than it is wide (as shown in the previous figure); landscape indicates that the paper is wider than it is tall.
   - **Network** — Click this button to locate the printer or plotter on the network that you want to set as the default. This button only displays for users running under Windows 2000 and Windows XP Pro. The Connect to Printers dialog displays.
3. To select a default printer, do one of the following:
   - Select the path of the printer you want to use as your default and click **OK**,
   - Double-click the printer in the list.

   Using either method the Printer Preferences window redisplays.
4. Click **OK** to confirm your selections and set your MapInfo Professional default printer options.

Note: If you selected **Save Printer Information to Workspaces** in the Startup preferences, MapInfo Professional saves the printer information and settings to the workspace.

To set this preference, make changes in the Startup Preferences dialog box.

5. Click **OK** to save these settings and return to the Preferences dialog box.
6. Click **OK** to close the Preferences dialog box.

If you select the Windows Default printer, MapInfo will always use the printer that is currently set as the default in Windows. The settings for that printer will display in the MapInfo Preferred Printer Setup group. You will not, however, be able to change them in the **Printer Preferences** dialog box. To change the Windows default printer, go back to the Windows Control Panel.

To use a printer other than the one indicated in the Printer preferences, choose either:

- On the **File** menu, click **Print**. You can change the printer you are using in the Print dialog box, overriding the default printer settings.
- On the **File** menu, click **Page Setup**. In the Page Setup dialog box, click the printer to display the Preferences dialog box for the default printer. Select a different printer in the **Name** drop-down list. This will override the default printer set in the Printer preferences.

Note: The printer override applies only to the window you are currently printing. To change the default settings, go back to the printer preferences and specify a new default printer.

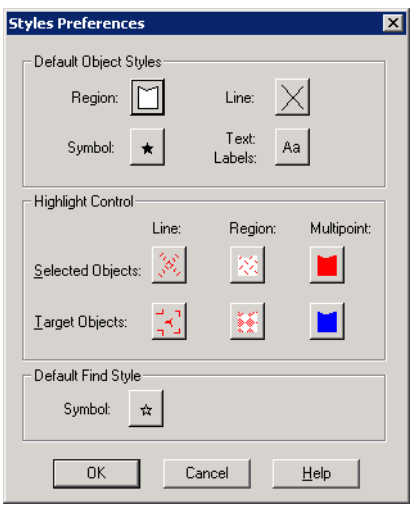
- For more information, see *Selecting a Printer* and *Error Message Displays when Print Output is Too Large* topics in the *Help System*.

Setting your Style Preferences

The Style preferences allow you to preset the look of your objects regions, text, and lines.

To set the default style preferences:

1. On the **Options** menu, point to **Preferences** and click **Styles** to display the Styles Preferences dialog box.



When you set the text styles you are also setting the label styles.

Complete your selections using these instructions.

Default Object Styles — Click the **Region**, **Symbol**, **Line**, and **Text** buttons to set these style options. These selections will serve to create the default settings for these style elements.

Note: Text styles apply to text objects and labels.

Highlight Control — Click this button to specify the Line, Region, and Multipoint styles of selected and target objects, as well as highlighting specifications in the Map window. Additionally, specify the style of selected and target multipoint objects. The default settings are shown in the **Style** boxes of the **Highlight Control** group. click one of the boxes to display the corresponding style dialog box and change its settings.

Symbol — Click this button to set the default symbol style for Query > Find tasks. In the **Symbol Style** dialog box, select the new symbol style and click **OK** to save them.

2. Click **OK** to save these settings and return to the Preferences dialog box. Click **OK** to close the Preferences dialog box.

- For more information, see *Changing the Find Symbol Style Locally* and *Inserting Styles into Tables* in the *Help System*.

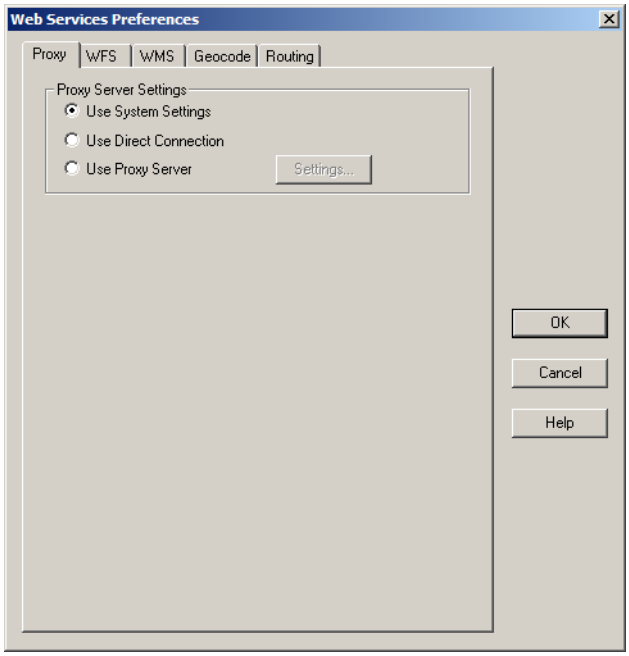
Setting the Web Services Preferences

The Web Services Preferences dialog box provides access to settings for the Web Feature Service and Web Map Service timeout values, GetMap pixel limits, and Proxy Server settings in MapInfo Professional. Additionally, you can set geocoding server and routing server options. These options allow you to control the web services preferences.

Note: You can set per-server defaults based on particular WFS and WMS servers in the **Override Timeout Values** section of the Server Information dialog box.

To access the Web Services Preferences dialog box:

1. Choose **Options** > **Preferences** > **Web Services** to display the Web Services Preferences dialog box.



2. Select the tab you want to set the options for and click **OK** to save the options you select.

Setting the Proxy Server Preferences

1. From the **Options** menu, click **Preferences** and then **Web Services** and then **Proxy** tab to display the proxy server options.

2. Select the preferences appropriate for your server and click **OK** to confirm them.

   Use System Settings

   Click this option to use the LAN settings in the system registry. This is the default preference. You can review the current LAN settings by clicking **Start > Control Panel > Internet Options > Connections Tab > LAN Settings**.

   Use Direct Connection

   Click this option to override the system LAN settings and try to connect directly to the Internet (not through a proxy server).

   Use Proxy Server

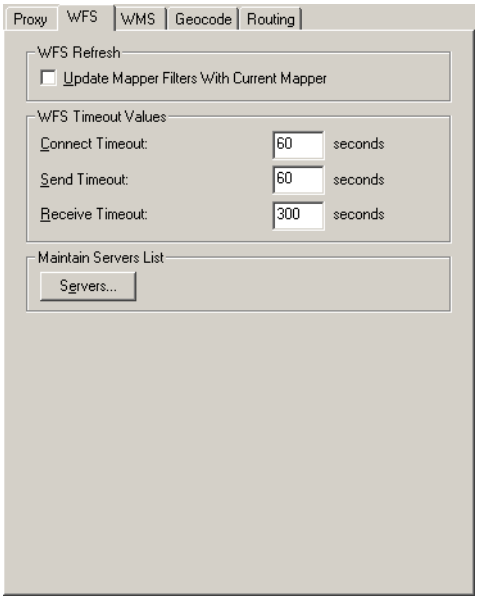
   Click this option to set and use the proxy server settings to connect to the Internet.

   Settings

   Click this button to set the proxy server options. See **Setting the Custom Proxy Server Preferences on page 143** for instructions on completing these settings.

Setting the WFS Server Preferences

1. From the **Options** menu, click **Preferences** and then **Web Services** and then **WFS** tab to display the WFS server options. This tab sets the WFS refresh, timeout, and server options.



2. Select the preferences appropriate for your server and click **OK** to confirm them.

WFS Refresh

You use the WFS Refresh option to retrieve updated GML information from the web feature service pertaining to the current layers.

Update Mapper Filters with Current Mapper

Select this check box to use the current filter settings to refresh the Map window. If you select this check box and the table has already been refreshed, the current bounds of the front-most map window are used. If the check box is cleared and the table is refreshed, the bounds of the map window (at the initial WFS request) are used.

Note: The original map bounds are used, regardless of the current map window bounds.

WFS Timeout Values

In this section you set the default WFS timeout values (in seconds) for the WFS servers you use. You can set per-server defaults based on particular WFS servers in the **Override Timeout Values** section of the WFS Server Information dialog box.

Connect Timeout

Indicates the amount of time (in seconds) allowed to establish an Internet connection request to a Web Feature server. If the request takes longer than this value, a timeout occurs. The default connect timeout is 60 seconds.

Send Timeout

Indicates the amount of time (in seconds) allowed to send an Internet request to a Web Feature server. If the request takes longer than this value, a timeout occurs. The default send timeout is 60 seconds.

Receive Timeout

Indicates the amount of time (in seconds) allowed to begin to receive a response from a request from a Web Feature server. The download can take longer than the timeout, but the response has to occur within the timeout setting. The default receive timeout is 300 seconds.

Maintain Servers List

Click the **Servers** button to display the **WFS Servers List**, where you can add, edit, and delete WFS servers.

Setting the WMS Server Preferences

1. From the **Options** menu, click **Preferences** and then **Web Services** and then **WMS** tab to display the WMS server options. This tab sets the WMS timeout, and server options.
2. Select the preferences appropriate for your server and click **OK** to confirm them.

   WMS Timeout Values

   In this section you set the default WMS timeout values (in seconds) for the WMS servers you use. You can set per-server defaults based on particular WMS servers in the **Override Timeout Values** section of the WMS Server Information dialog box.

   Connect Timeout

   Indicates the amount of time (in seconds) allowed establish an Internet connection request to a Web Map server. If request takes longer than this value, a timeout occurs. The default connect timeout is 60 seconds.

   Send Timeout

   Indicates the amount of time (in seconds) allowed to send an Internet request to a Web Map server. If the request takes longer than this value, a timeout occurs. The default send timeout is 60 seconds.

   Receive Timeout

   Indicates the amount of time (in seconds) allowed to begin to receive a response from a request to a Web Map server. The download can take longer than the timeout, but the response has to occur within the timeout setting. The default Receive Timeout setting is 300 seconds.

   WMS GetMap Pixel Limits

   The GetMap Pixel Limits option represents the maximum number of pixels (in width/height) that a map request is limited to. The GetMap request is designed to retrieve the highest resolution map image as is necessary to render the image on the screen, for a printer, or for an export file. This option prevents the request from going higher than the specified values. Different servers have different limits, so you can set the limit that works best for your environment.

   Note: You can set per-server defaults for **GetMap Pixel Limits** in the WMS Server Information dialog box.

   Unfortunately, servers do not report their limits to us, so if the GetMap request fails, it means that you have entered a value that is too large.

Typically, large GetMap requests occur when you are printing or exporting windows containing WMS images. This happens because printing and exporting occurs at larger sizes and/or higher resolutions than on-screen display requires.

Note: You can also use this option to shorten the WMS map retrieval time, but remember that the resulting image will display at a lower resolution.

Max Width

Max Width specifies the maximum number of pixels for a GetMap request in the X direction.

Max Height

Max Height represents the maximum number of pixels for a GetMap request in the Y direction.

Maintain Servers List

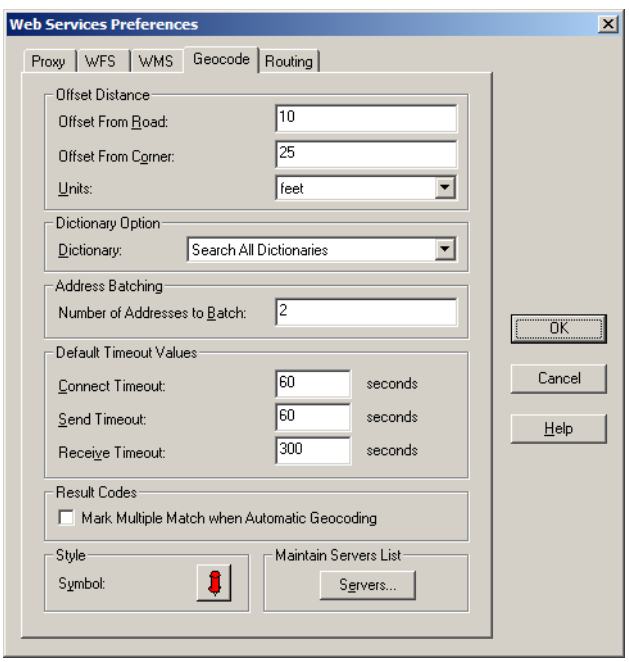
Click the **Servers** button to display the WMS Servers List, where you can add, edit, and delete WMS servers.

Setting the Geocoding Server Preferences

You can get more information about setting up a geocoding server in **Setting up a Geocoding Server on page 145**. A table must be open to enable the Geocode using Server menu item.

To set the geocoding server preferences:

1. From the **Options** menu, click **Preferences** and then **Web Services** and then **Geocode** tab to display the Geocoding server options. This tab sets the geocoding server timeout and maintenance options.



2. Select the preferences appropriate for your server and click **OK** to confirm them.

Offset From Road

Use this field to indicate the default distance the geocoded point should be from the road, if applicable.

Offset From Corner

Use this field to indicate the default distance the geocoded point should be from the corner, if applicable.

Units

Use this field to indicate the units for the previous entries.

Dictionary

Use this drop-down list to select the dictionary options you want the geocoder to use (Address or User). These libraries exist on the service. Not all dictionary types may exist on all services. There are a maximum of 5 options:

Select All Dictionaries - Select this option to use both the user and address dictionaries.

Address Dictionary Only - Select this option to use only the service's address dictionary and not the user's dictionary.

User Dictionary Only - Select this option to use only the user's address dictionary and not the service's address dictionary

Prefer Address over User - Select this option to use the service's address dictionary before the user's address dictionary.

Prefer User over Address - Select this option to use the user's address dictionary before the service's address dictionary.

Number of Addresses to Batch

Use this option to specify how many addresses you want to send to the geocoding service at a time. The number of addresses you send at a time can affect performance. If you are using the EOLS, the batch size can also affect billing of geocoding transactions if you cancel a geocoding operation during processing.

Default Timeout Values

Use these timeout values to set the communication parameters for the geocoding service. You can override these defaults on a per-service basis locally by editing the service in the Services list and specifying the override.

Note: When you set the time out values locally, you may want to keep in mind the size of your request. The more complicated your request, the more time may be required for connection/sending/receiving.

Connect Time Out

Use this setting to indicate the amount of time allowed establish an Internet connection to the geocoding service. If the request takes longer than this value, a timeout occurs. The default connect time out is 60 seconds.

Send Time Out

Use this setting to indicate the amount of time allowed to send an Internet request to the geocoding service. If the request takes longer than this value, a timeout occurs. The default send time out is 60 seconds.

Receive Time Out

Use this setting to indicate the amount of time allowed to begin to receive a response from a request to geocoding service. The download can take longer than the time out, but the response has to occur within the timeout setting. The default receive time out is 300 seconds.

Result Codes - Mark Multiple Match when Automatic Geocoding

Select this option to display a result code of M when you are performing automatic geocoding and there are multiple matches for an address. If you do not select this option, and there are close matches, the system displays an S for street only. See *Understanding the Geocoding Result Codes* in the *Help System*.

Symbol Style

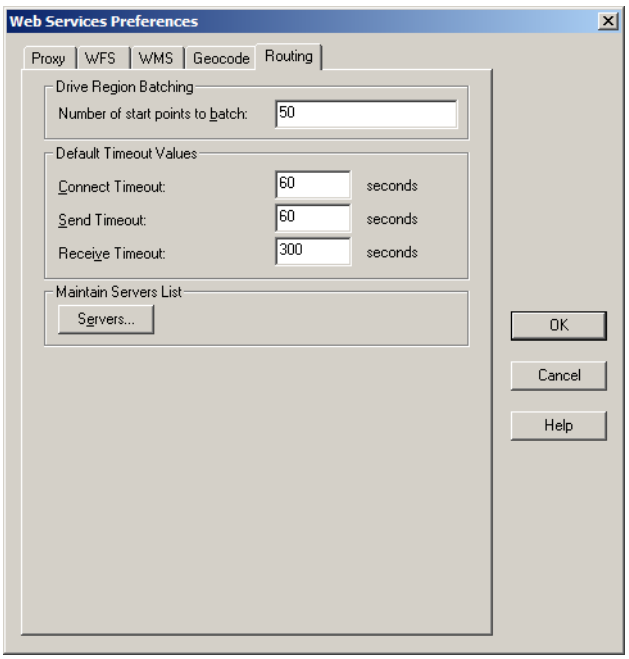
Use this setting to set the default symbol style for the points you are creating for geocoding. You can override it during a geocoding operation using **Symbol Style** in the **Common Options** tab.

Maintain Servers List

Click **Servers** to display the **Geocoding Servers List**, where you can add, edit, and delete MapMarker and Envinsa geocoding servers. This list is the same as you would see when you select the **Servers** button in the **Geocode Using Servers** and the Find Address dialog box.

Setting the Routing Server Preferences

1. From the **Options** menu, click **Preferences** and then **Web Services** and then **Routing** tab to display the Routing server options. This tab sets the driving region server maintenance options.



2. Select the preferences appropriate for your server and click **OK** to confirm them.

Maintain Servers List

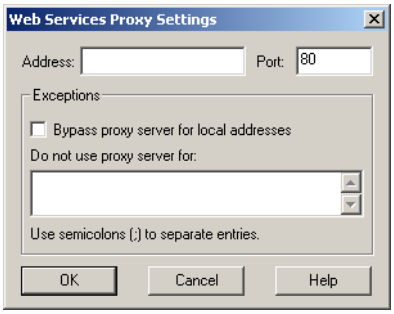
Click the **Servers** button to display the **Routing Servers List**, where you can add, edit, and delete Envinsa Drivetime servers.

Setting the Custom Proxy Server Preferences

You can configure MapInfo Professional for proxy server use. By default, MapInfo Professional uses your system LAN settings as the default proxy server settings. To set the Web Services Preferences to use a different proxy server, you must know the IP address and port number of the alternate proxy server to properly complete these entries.

To set up your web service preferences to use a different proxy server than those provided in your system LAN settings:

1. From the **Options** menu, click **Preferences** and then **Web Services**. The Web Services Preferences dialog box displays.
2. In the **Proxy Server Settings** box, click the **Use Proxy Server** button and click the **Settings** button. The Web Services Proxy Settings dialog box displays.



Use these options to configure the proxy server for your internet and intranet use.

3. Enter the IP address of your computer and the port number in the fields provided. If you do not know this information, check the IP Config settings or consult your system administrator.
4. To access local addresses without going through the proxy server, select the **Bypass proxy server for local addresses** check box.
5. To exclude some non-local IP addresses from the proxy server, enter the IP addresses in the text area provided, using a semicolon to separate the addresses.
6. Click **OK** to save your entries.

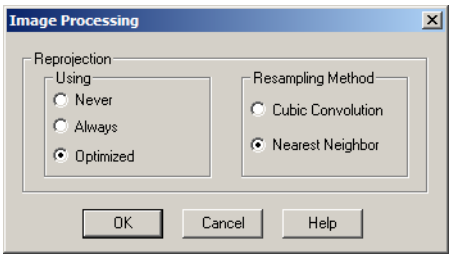
As a result of these settings, you are prompted for a user name and password when you are attempting to access the Internet to use the Web Map Service or the Web Feature Service features.

Setting up the Image Processing Preferences

You can control the reprojection options of your vector and raster maps using the Image Processing Preference. Reprojection, particularly when reprojecting seamless tables or other large raster map layers, can take a long time. This is particularly true if your reprojection is dramatic, as when you are transforming world-wide rasters from Long/Lat to Mercator, for example. To see the results of this setting go to *Reprojecting a Raster based on a Vector Map* in the *Help System*.

To set the raster reprojection options for all registered raster files:

1. From the **Options** menu, choose **Preferences** and **Image Processing** to display the Image Processing dialog box.



*You can also access these options using the **Image Processing** button in the Map Options dialog box.*

The **Resampling Method** options are enabled when you select **Always** or **Optimized**. Never is the default reprojection option and reflects the vector reprojection only behavior.

2. Select the reprojection option that suits your raster reprojection needs. Select:
   - **Never** to prevent raster reprojection. This is the default setting which preserves the pre-version 8.5 MapInfo Professional behavior.
   - **Always** to ensure that reprojection is always performed, that is, MapInfo Professional calculates the image's coordinates based on a precise formula and then the pixels are resampled using Cubic Convolution or Nearest Neighbor options.
   - **Optimized** to determine the reprojection of a raster image based on the look of the destination rectangle (a selection of the image) after transformation into the source image space. If it looks as a rigorous rectangle (two sides are parallel to x-axis and two sides parallel to y-axis), then the standard Windows functions stretch the source image in both directions, as it was in pre-version 8.5 MapInfo Professional. If the image fails the rigorous rectangle test, the reprojection is performed using the resampling options.
3. If you select Always or Optimized, you can decide how best to resample the image from these options:
   - **Cubic Convolution** provides the best restoration of pixel values because of their separateness. Using this option, a pixel in the destination image is calculated based on the pixel values in a 4x4 pixel window centered at the original pixel in the source image. The coordinates of the original pixel are calculated for every pixel of the destination image based on a special optimized procedure. Pixels are then weighted based on the basic pixel coordinates. In general, we recommend you use the Cubic Convolution resampling method for aerial images and satellite rasters to get a better image quality. The Cubic Convolution algorithm used in MapInfo Professional is based on the work of S.K. Park and R.A. Schowengerdt, Computervision, Graphics and Image Processing (1983, Volume 23. Pages 258-272).

- **Nearest Neighbor** replaces the pixel value in the reprojected image with the original pixel value from the source image. This resampling method takes less time to render than the Cubic Convolution method, but may be less precise. In general we recommend you use Nearest Neighbor resampling for raster maps, grids, and scanned maps to get faster results.

Note: When you are reprojecting 8-bit palette raster images, such as color .TIFF or .BMP images, MapInfo Professional uses the Nearest neighbor resampling option without regard to the resampling method you choose.

4. After you have selected these options, click **OK** to save them.

   When you choose the Always or Optimized reprojection options, the reprojection process runs in the background, so there is nothing to see, but you can see the differences that the Cubic Convolution and Nearest Neighbor resampling options make in the way the raster displays.

Note: The data used in this instruction set ships with the product. You can retrieve this data from the data CD.

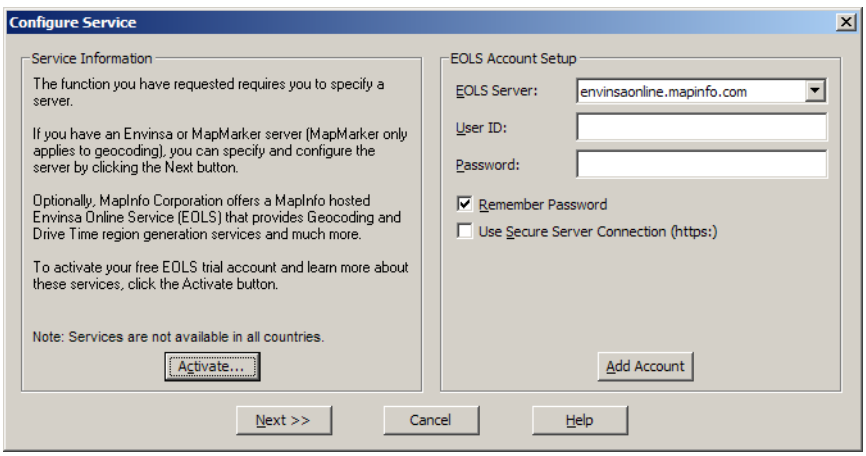
Setting up a Geocoding Server

To use MapInfo Professional with a geocoding server, you need MapMarker Java Server 4.0 or later or Envinsa Server 4.0 or later. MapInfo Professional supports any geography that is supported by Envinsa currently. Envinsa supports MapMarker Java Server V2, V3, and V4. Keep in mind that any Envinsa server only supports the data that is installed.

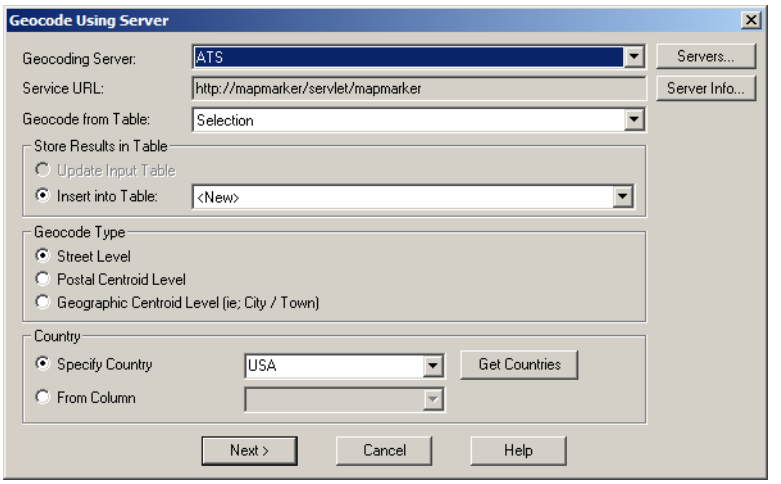
Before you can access a MapMarker or Envinsa geocoding service, you need to connect MapInfo Professional to its server. This process gives MapInfo Professional all the information it needs to access the geocoding service. You need to enter this information only once per service.

To set up a geocoding server:

1. Make sure that the table you want to geocode is open.
2. From the **Table** menu, choose the **Geocode Using Server** option to display the Geocode using Server dialog box. If you have not added any geocoding servers yet, the Configure Service dialog box displays.

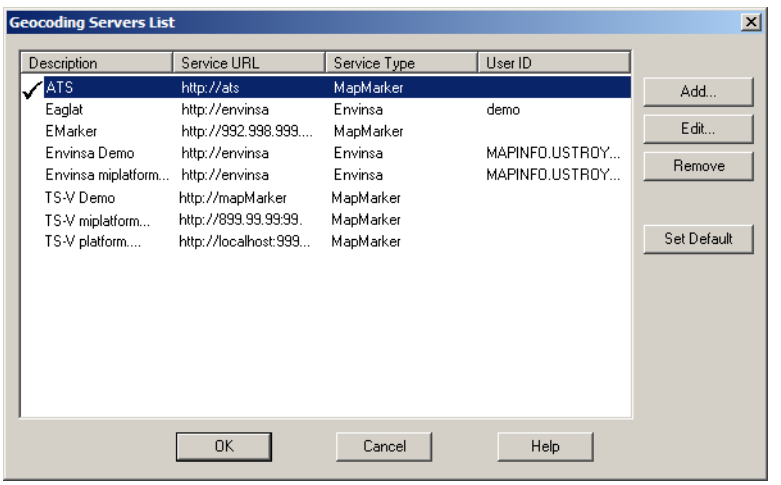

Configure Service
Service Information
The function you have requested requires you to specify a server.
If you have an Envinsa or MapMarker server (MapMarker only applies to geocoding), you can specify and configure the server by clicking the Next button.
Optionally, MapInfo Corporation offers a MapInfo hosted Envinsa Online Service (EOLS) that provides Geocoding and Drive Time region generation services and much more.
To activate your free EOLS trial account and learn more about these services, click the Activate button.
Note: Services are not available in all countries.
Activate...
EOLS Account Setup
EOLS Server:
envinsaonline.mapinfo.com
User ID:
Password:
Remember Password
Use Secure Server Connection (https:)
Add Account
Next >>
Cancel
Help

3. Do one of the following:
   - *If you do not have a MapMarker or Envinsa geocoding server*, you can use MapInfo's hosted Envinsa Online Service to try this functionality. Click **Activate** to sign up for a geocoding service near you. See *Accessing Online Services at MapInfo* in the *Help System* for more instructions in signing on to this service.
   - *If you have a MapMarker or Envinsa geocoding server*, click **Next** to display the Geocoding Using Server dialog box.



After you add geocoding servers to MapInfo Professional, this box displays your default server.

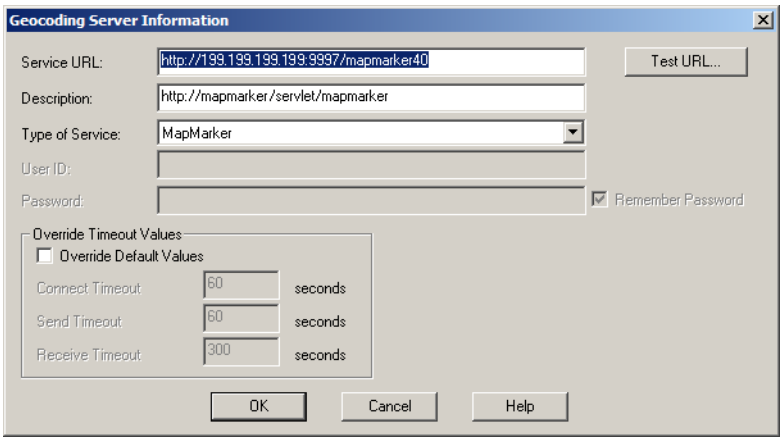
4. Click **Servers** to display the Geocoding Servers List dialog box.



This list is empty by default until you add a geocoding server either using the Servers button in the Geocode Using Server dialog box or in the geocoding web services preferences.

Note: When you have entered a server that you will use most frequently, highlight it in the list. Click **Set Default**. A check mark displays to indicate that the server you selected will open by default.

5. To add a new server, click **Add**. The Geocoding Server Information dialog box displays.



6. Type the service URL and description in the fields provided. You can connect to either a MapMarker or Envinsa geocoding service by making a selection in the **Type of Service** drop-down list.

   When you select an Envinsa service, enter a user ID and password in the fields provided. Select the **Remember Password** check box to save the password in encrypted format in the server list. This option is selected by default. If you prefer to enter the password each time you access this server, clear this check box.

CAUTION: **Anyone knowing this password will be able to use the Envinsa geocoding service.**

7. Consider whether the default timeout settings are appropriate for the service you are adding. The default settings that display in each field are set in the geocoding web services preferences. You can change these global defaults using the instructions in **Setting the Geocoding Server Preferences on page 140**.

   To reset these entries for the current server, select the **Override Default Values** check box and enter new timeout settings using these definitions:

   Connect Timeout

   Indicates the amount of time (in seconds) allowed to establish an Internet connection request to a geocoding service. If the request takes longer than this value, a timeout occurs. The default connect timeout is 60 seconds.

   Send Timeout

   Indicates the amount of time (in seconds) allowed to send an request to a geocoding service. If the request takes longer than this value, a timeout occurs. The default send timeout is 60 seconds.

   Receive Timeout

   Indicates the amount of time (in seconds) allowed to begin to receive a response from a request from a geocoding service. The download can take longer than the timeout, but the response has to occur within the timeout setting. This default timeout is 300 seconds.

   If the default timeout settings are appropriate for the new service, clear this check box.

8. When you have completed these entries, click **Test URL** to ensure that the connection is made. When you click **Test URL** and MapInfo Professional can connect to the service, the Geocoding Server Details dialog box displays.

   If the URL is valid, the **Engine Info** list displays the service's available, country data, the supported geocoding types (Street, Postcode, Geographic), and the version information. Click the column headings to sort the entries alphabetically. Click **Close** to return to the Geocoding Server Information dialog box.

   Note: If you select **Test URL** and no service connection is found, an error message displays.

9. When all of these fields and options are complete, click **OK** to save the new geocoding server.

Setting up the Routing Server

Before you can access an Envinsa Drivetime service, you need to show MapInfo Professional where to find the Routing server it is housed on. This process gives MapInfo Professional all the information it needs to access the server. You need to enter this information only once per server. To set the routing server preferences, see **Setting the Routing Server Preferences on page 142**.

To add a Routing server:

1. From the **Options** menu, choose the **Preferences** option and then select **Web Services**. Click the **Routing** tab to set the web service preference options.
2. To add a new routing server, click **Servers** to display the Routing Servers List dialog box.
3. Click **Add**. The Routing Server Information dialog box displays.

   MapInfo Professional supports server-side and proxy server authentication. If you use a proxy server for Internet access and your routing server also requires user/password authentication, you authenticate with the proxy server first. As a result, the Connection dialog box displays twice -- once for the proxy server and once for the routing server.

4. Type the server URL, the server description, the default user name and password in the fields provided. Click the check box to remember the password when you enter the correct user name.
5. Consider whether the default timeout settings are appropriate for the server you are adding. The default settings display in each field. The options you select in this dialog box determine the Routing server's default settings. To change these entries, select the **Override Default Values** check box and enter new timeout settings using the same definitions.

   Note: When you have entered a server that you will use most frequently, highlight it in the list. Click **Set Default**. A check mark displays beside the server you selected.

6. When you have completed these entries, click **Test URL** to ensure that the connection is available. The Routing Server Details dialog box displays.

   If the URL is valid, the **Countries** list displays the server's available country data. Click **Close** to return to the Routing Server Information dialog box.

   Note: If you select **Test URL** and no server connection is found, an error message displays.

7. When these fields and options are complete, click **OK** to save the new routing server.

Starting up and Leaving MapInfo Professional

In this section we cover the very basics of starting MapInfo Professional, using the STARTUP.WOR, and exiting the program. Since opening a table is basic to getting started in using MapInfo Professional, we cover that topic here, as well.

Starting MapInfo Professional

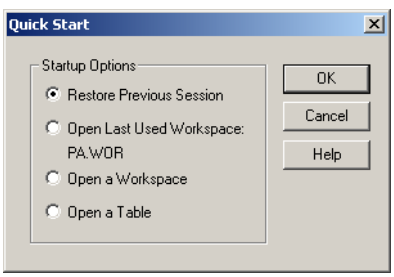
Now that you have MapInfo Professional installed and have read a little about its power and functionality, you are ready to begin mapping and analyzing your data.

To start MapInfo Professional:

- Do one of the following:
  - Double-click the MapInfo Professional icon on your desktop. In a few seconds, MapInfo Professional's Quick Start dialog box displays.
  - From the **Start** menu, select **MapInfo Professional 9.0** (or **MapInfo Professional 9.0 Client**, if this is a network installation) from the Selected Program folder.

  Using either method the Quick Start dialog box displays.

  Here you can choose how you want to start your mapping session. The Quick Start dialog box displays every time you start MapInfo Professional, but you can change this behavior in the Startup preferences (On the **Options** menu, point to **Preferences** and click **Startup**) using instructions in *Setting the Startup Preferences* in the MapInfo Professional *Help System*. In the Startup Preferences dialog box, clear the Display Quick Start dialog box to deactivate the display of the Quick Start dialog box.



If you are returning to MapInfo Professional, you can return to the previous mapping session by choosing Restore Previous Session or use last workspace. If this is your first look at MapInfo Professional, choose the Open a Table option to begin. The Open dialog box displays.

Exiting MapInfo Professional

To leave MapInfo Professional:

- On the **File** menu, click **Exit**. There is no confirmation message.

CAUTION: **If you made changes to a table and did not save them a prompt appears asking you if you want to save the changes. Unless you choose Save, the changes are lost.**

- For more information, see *Leaving MapInfo Professional using the MAPINGOW.WOR Workspace* in the Help System.

File Format Types Supported

You can open the following file types using the **File > Open** capability in MapInfo Professional:

- **TAB**: MapInfo .TAB files (*.tab)
- **WOR**: MapInfo workspace files (*.wor)
- **MDB**: Microsoft Access files (*.mdb)
- **DBF**: dBASE DBF files (*.dbf)
- **TXT**: Delimited ASCII files (*.txt)
- **WKS**: Lotus 1-2-3 files (*.wk1, *.wks, *.wk3, *.wk4)
- **XLS**: Microsoft Excel files (*.xls)
- **SHP**: ESRI Shapefiles (*.shp)
- **Raster image files** (*.bil, *.sid, *.gen, *.adf, *.img, *.ntf, *.ecw, *.url, *.tif, *.grc, *.bmp, *.gif, *.tga, *.jpg, *.pcx, *. jp2, *.j2k, *.png, *.psd, *.wmf, *.emf, *.map)
- **Grid images** (*.adf, *.flt, *.txt, *.asc, *.img, *.dem, *.dt0, *.dt1, *.dt2, *.mig, *.grd)
- **CSV**: Comma Delimited files (*.csv)

Note: Grid Format Direct Support: The following grid handlers support direct read of DEM-USGS Text (.dem); *GTOPO30 (.dem) and DTED levels 1, 2, 3 (.dt0, .dt1, .dt2)*. These grid handlers are read-only; they cannot be used to create grid files during the Create Grid Thematic interpolation process.

Using the Universal Translator, you can import these file format types:

- **DWG/DXF**: AutoCAD
- **E00**: ESRI ArcInfo format
- **SHP**: ESRI Shapefile format
- **MID/MIF**: MapInfo file formats
- **TAB**: MapInfo .TAB files
- **DGN**: Microstation Design files
- **CATD.DDF**: Spatial Data Transfer Standard (SDTS)
- **FT**: Vector Product Format (VPF)

You can import the following file types into MapInfo Professional using **Table > Import**:

- **MIF**: MapInfo Professional Interchange Format. MapInfo Professional's data interchange format (ASCII file format).
- **DXF**: The graphic/data interchange format for AutoCAD and other CAD packages.
- **MBI**: MapInfo Professional Boundary Interchange format. An ASCII file for MapInfo DOS boundary files.
- **MMI**: MapInfo DOS MMI
- **IMG**: A file format for MapInfo Professional for DOS image files.
- **GML**: OS MasterMap format.
- **GML/XML:** Geographic Markup Language 2.1 (*.gml, *.xml)

Note: You can download raster handlers for NIMA formats such as ADRG, CADRG, ASRP, CIB, USRP, and NITF formats from the MapInfo website or get them from the Installation CD.

MapInfo Professional imports graphics and textual information from MapInfo Professional Interchange Format, DXF, MBI, and MMI files. MapInfo Professional imports only graphics from IMG.

These are the Raster image file formats MapInfo Professional supports:

- **MrSID**: The MrSID raster handler allows you to open and display raster images compressed in the MrSID format.
- **BMP -- Windows Bitmap**. Windows format only: Monochrome: 8 Bit Color, 24 Bit Color
- **GIF -- Graphics Interchange Format**
- **GIF89a Format (non-interlaced only)**: Monochrome, 8 Bit Color
- **JPEG-2000 -- Joint Photographic Experts Group:** MapInfo Professional supports creating JPEG 2000 files using Save Window As and viewing JPEG 2000 files using the LeadTools raster handler.
- **JPEG -- Joint Photographic Experts Group**
- **JFIF V1.02 (JPEG File Interchange Format):** 8 Bit Gray, 24 Bit Color, No Subsampling, 24 Bit Color, YUV422 Subsampling, 24 Bit Color, YUV411 Subsampling
- **PCX -- ZSoft Paintbrush**
- **PCX File Format Version 5 (Paintbrush Version 3.0): Monochrome**, 8 Bit Gray, 8 Bit Color, 24 Bit Color
- **SPOT -- Satellite Pour l'Observation de la Terre --** Spot Image Formats 1.5 and 4.0: 8 Bit Gray, Format 1.5, 8 Bit Gray, Format 4.0, 24 Bit Color, Format 1.5, 24 Bit Color, Format 4.0
- **TGA -- Truevision TGA Truevision File Format Specification 2.0**: 8 Bit Gray, 8 Bit Color, 24 Bit Color
- **TIFF -- Tagged Image File Format: TIFF Revision 5.0**, Monochrome (Class B), Uncompressed, Monochrome (Class B), PackBits Compression, 8 Bit Gray (Class G), Uncompressed, 8 Bit Color (Class P), Uncompressed, 24 Bit Color (Class R), Uncompressed
- **PNG – Portable Network Graphics Format**
- **PSD – Adobe Photoshop Version 3.0**
- **WMF – Windows Metafile**: The raster handler will load a rasterized version of the WMF file.
- **ECW** – Enhanced Compression Wavlet by ER Mapper
- **GRD/GRC – MapInfo Vertical Mapper**: GRD files can be treated as either a grid or raster image. If the associated .TAB file contains a RasterStyle 6 entry, the file will be treated as a grid.
- **ASRP – ARC Standard Raster Product to 1.2**
- **ADRG – ARC Digitized Raster Graphic**
- **CADRG- Compressed ARC Digitized Raster Graphic**
- **NITF – National Imagery Transmission Format (version 2.x)**
- **CIB – Controlled Image Base**
- **GIF – Graphics Interchange Format**
- **TIFF LZW– Tagged Information File Format LZW**
- **TIFF CCITT Group 4– Tagged Information File Format CCITT Group 4**
- **GeoTIFF**

4

The Basics of MapInfo Professional

Now that you have installed MapInfo Professional®, you are probably anxious to get mapping. But, if you are new to MapInfo Professional, take a few minutes to read this chapter to familiarize yourself with the concepts, components, and tools for successful computer mapping.

Sections in this Chapter:

- A Tour of the MapInfo Professional Desktop 154
- Understanding Your Data in MapInfo Professional 160
- Working with Layers in the Layer Control 162
- Working with Thematic Layers 169
- Working with Seamless Layers 172
- Data – Where MapInfo Professional Begins 175
- Reviewing the Windows in MapInfo Professional 183
- Saving, Closing, and Exporting Your Work 190
- Using the Tools in the Tool Manager 195

A Tour of the MapInfo Professional Desktop

This section details the tools and commands that are available to you in the MapInfo Professional product. You may refer to these frequently as you familiarize yourself with MapInfo Professional.

Working with Toolbars

MapInfo Professional provides four toolbars of tool buttons and commands to give you tremendous mapping creativity at the click of a button.

To reshape the toolbars, click and drag on their borders. Drag the title bar to move them. To dock a toolbar, drag it to the area directly underneath the Main menu bar. The toolbar changes shape and positions itself directly under the menu bar. You can easily change it back to the floating view by clicking the background area of the toolbar and dragging it away from its position. The toolbar retains the same shape as it had before you docked it.

You can also dock and undock a toolbar from the **Options** menu.

1. On the **Options** menu, click **Toolbars**, and in the Toolbar Options dialog box.
2. Do one of the following:
   - Select the **Floating** check box for each toolbar that you want to have float and be able to move around.
   - Clear the **Floating** check box for each toolbar you want to dock.

   Note: To display or hide the toolbars, select or clear the **Show** check box. You can also choose whether you want to display color buttons or larger buttons for each toolbar.
3. Choose **Save as Default** to save your arrangement. To remove a toolbar from the screen, click its **Ctrl** box.

Reviewing the Standard Toolbar

The Standard toolbar contains tools for commonly performed menu functions from the File, Edit, and Window menus. It also contains tools for quick access to a Redistricting window and online Help. Many of these tools are familiar to you from working with Microsoft Windows.

New Table

Open

Open Workspace

Open WMS Table (Web Map Service)

Open WFS Table (Web Feature Service)

Save Table

Save Workspace

Save Window

Print

Cut

Copy

Paste

Undo

New Browser

New Map Window

New Graph Window

New Layout Window

New Redistricting Window

Help

Close All

Reviewing the Main Toolbar

The Main toolbar contains buttons for selecting objects, changing the view of the Map window, getting information about an object, and showing distances between objects. It also contains buttons that allow you to change layer attributes and open the Legend or Statistics window.

	Select	Accesses the **Select** tool to select objects/records in a Map, Layout, or Browser window. Also acts as the default pointer/cursor tool.
	Marquee Select	Accesses the **Marquee Select** tool so you can select and search for map objects within a given rectangle (marquee box).
	Radius Select	Accesses the **Radius Select** tool so you can select and search for map objects within a circular region.
	Polygon Select	Accesses the **Polygon Select** tool so you can select objects within a polygon.
	Boundary Select	Accesses the **Boundary Select** tool so you can select and searches for map objects within a given region.
	Unselect All	Accesses the **Unselect All** tool so you can clear all of your object and record selections. Performs the same operation as Unselect All.
	Invert Selection	Selects all objects or records not included in the current selection, and cancels the current selection.
	Zoom-in *	Accesses the **Zoom-in** tool to get a closer area view of a map or layout.

	Zoom-out *	Accesses the **Zoom-out** tool so you can get a wider area view of a map or layout.
	Change View *	Accesses the **Change View** dialog box so you can specify settings for Map window width, map scale, resizing, and centering.
	Graph Select	Accesses the **Graph Select** tool. As you click graph objects, such as a riser bar, pie slice, column, etc., this tool selects the corresponding records from the table.
	Grabber *	Accesses the **Grabber** tool so you can reposition a map or layout within its window.
	Info tool *	Accesses the Info tool so you can view the tabular data that is associated with a map object.
	HotLink	Accesses the **HotLink** tool, so you can launch active objects such as files or URLs from your Map window.
	Label	Accesses the **Label** tool so you can label objects with information from the related database.
	Drag Map Window *	Accesses the **Drag Map Window** button to drag an MapInfo Professional map into an OLE container application.
	Layer Control	Accesses the Layer Control dialog box so you can specify how the various tables in a Map window are layered and displayed.
	Ruler	Accesses the **Ruler** tool to determine the distance between two points and the length of some path.
	Legend	Accesses the Legend window for maps or graphs.
	Statistics	Accesses the **Statistics** window to tally the sum and average of all numeric fields for the currently chosen objects or records.
	Set Target District from Map	Sets the target district from the map during a Redistricting session.
	Assign Selected Objects	Assigns selected objects to the target district during a Redistricting session.
	Clip Region On/Off	Redisplays the entire map.
	Set Clip Region	Isolates a map region for display.

* These tools are also available when you access your MapInfo .TAB map within a container application such as MS Word, PowerPoint, etc.

Reviewing the Drawing Toolbar

The Drawing toolbar contains tools and commands that are used to create and edit map objects. For more about how to use these buttons, see **Drawing and Editing Objects in Chapter 8 on page 275**.

	Add Node	Accesses the **Add Node** tool, which allows you to add a node to regions, lines, or polylines when you are in Reshape mode.
	Arc	Accesses the **Arc** tool, which allows you to draw an arc the size and shape of one quarter of an ellipse.
	Ellipse	Accesses the **Ellipse** tool, which allows you to create elliptical and circular objects.
	Frame	Accesses the **Frame** tool, which allows you to create frames in the Layout window to display maps, graphs, browsers, and legends.
	Line	Accesses the **Line** tool, which allows you to draw straight lines.
	Line Style	Accesses the **Line Style** dialog box where you can change the style, color, and width of line objects.
	Polygon	Accesses the **Polygon** tool, which allows you to draw polygons (a closed, connected sequence of lines).
	Polyline	Accesses the **Polyline** tool, which allows you to draw polylines (an open, connected sequence of lines).
	Rectangle	Accesses the **Rectangle** tool, which allows you to draw rectangles and squares.
	Region Style	Accesses the **Region Style** dialog box where you can change the fill pattern, color, and background, plus the border style, color, and width of region objects.
	Reshape	Toggles in and out of **Reshape** mode. Reshape allows you to edit regions, polylines, lines, arcs, and points by moving, adding, and deleting nodes that define them.
	Rounded Rectangle	Accesses the **Rounded Rectangle** tool, which allows you to draw rounded rectangles and squares.
	Symbol	Accesses the **Symbol** tool, which allows you to place point symbols on your map like “push pins.”

	Symbol Style	Accesses the **Symbol Style** dialog box where you can change the style, color, and size of a symbol object.
	Text	Accesses the **Text** tool, which allows you to add titles, labels, and annotation to maps and layouts.
	Text Style	Accesses the **Text Style** dialog box where you can change the font typeface, size, style, color, and background of text objects.

Reviewing the DBMS Toolbar

The DBMS Toolbar contains buttons and commands that are used to access tables residing on a remote database. These options are only available if you have installed a relational database manager.

	Open DBMS Table Button	Accesses the Open dialog box, which allows you to access a remote database. If a connection has not been established, you are prompted to open one. This button is also found in the Open dialog box if DBMS is installed.
	Make DBMS Table Mappable Button	Accesses the Make DBMS Table Mappable dialog box, which allows you make a table linked to a remote database mappable in MapInfo Professional.
	Refresh DBMS Table Button	Accesses the Refresh DBMS Table dialog box, which allows you to refresh a MapInfo Professional linked or live table with the most recent data residing on the remote database for that linked or live table.
	Unlink DBMS Table Button	Accesses the Unlink DBMS Table dialog box, which allows you to unlink a downloaded table from its remote database.
	Change Symbol for a Mappable DBMS Table Button	Accesses the Change Symbol for a Mappable DBMS Table dialog box, and allows you to change the symbol style of a mappable DBMS table.
	Disconnect DBMS Button	Accesses the Close DBMS Disconnection dialog box, where you can close a connection to a remote database.

Using Workspaces

A workspace is a list of all the tables, windows, and settings you are using, stored in a file with the extension .WOR. Workspaces are a convenient way to return to a previously created map without having to open each table file individually. The workspace keeps track of the following elements:

- Map, Browser, Graph, 3DMap, and Layout windows, including their size and position
- Query tables created from base tables using either the Select or SQL Select statements (queries on queries will not be saved)

- Graphs
- Thematic maps
- Legend windows
- Cosmetic objects
- Labels
- Styles for fonts, symbols, lines, and fill patterns used to display objects

To view the contents in the workspace file, open the .WOR file in MapInfo Professional, a text editor or word processor.

Note: When you save a workspace, you cannot save any references to selections or queries made by the Selection tools or the Query options.

Opening a Workspace

Any previously opened tables and windows will be left untouched when you open a workspace. However, to avoid cluttering up your screen with unnecessary windows, use the Close All command from the File menu before adding the workspace.

When you exit MapInfo Professional, the MapInfo Professional workspace (MAPINFOW.WOR) stores the last session (unless you have set your preferences so that the workspace will not be written).If there are files you don't want added to your workspace, close them before exiting.

To open a workspace:

1. Choose **File > Open**. The Open dialog box displays.
2. Choose **Workspace** (*.wor) from the **Files of type** drop-down list.
3. Specify the name, directory and drive for the workspace you want to open.
4. Click **OK**.

When you exit MapInfo Professional, the MapInfo Professional workspace (MapInfo.wor) stores your last session. If there are files you don't want added to your workspace, make sure you close them before exiting.

- For more information, see *Opening Multiple Workspaces* in the *Help System*.

How Renaming Tables Affects Workspaces

When you change the name of a table listed in a workspace, you invalidate the workspace. Table names are stored in the workspace file, so if change it, the workspace cannot find it.

For example, if you create a workspace called CUSTOMER.WOR that contains the STATES table. If you later rename the STATES table to AMERICA, MapInfo Professional will not be able to open the customer.wor workspace. It will try to open the STATES table and not be able to locate it.

There are two ways to avoid this problem:

- Make any table name changes before you start to build workspaces.
- Open the workspace file in any text editor and manually change the table names.
- Open a workspace. Rename the table(s) using the Rename Table dialog box and immediately save the workspace.

Saving Printer Information to a Workspace

MapInfo Professional enables you to save your printer information to a workspace, and restore printer information from a workspace. These settings are located in the Startup preferences (on the **Options** menu, point to **Preferences**, and click **Startup**). To save printer information to a workspace, check the **Save Printer Information to Workspaces** check box. Subsequently, when you save your workspace, the printer name, paper orientation, paper size, and the number of copies are saved. When this preference is on, the printer settings are saved in a workspace file.

Note: We recommend that you leave this preference on.

To restore printer information from a workspace, check the **Restore Printer Information to Workspaces** box. When you open the workspace, the printer name, paper orientation, paper size, and the number of copies are restored. This is useful if you are sharing workspaces with other MapInfo Professional 6.0 or later users who are also using the same printers. You may want to leave it off if you want to send the workspace to someone who is using a different printer. If this preference is turned off, MapInfo Professional uses the default printer selected in the Printer preferences.

Note: You can get additional printer advice in the MapInfo Professional *Printing Guide*, which is located in the Documentation subfolder of your installation directory.

Understanding Your Data in MapInfo Professional

Computer maps are organized into layers. Think of the layers as transparencies that are stacked on top of one another. Each layer contains different aspects of the whole map.

What is a Layer?

In MapInfo Professional you begin by opening your table of data and displaying it in a Map window. Each table displays as a separate layer. Each layer contains the table plus any map objects, such as regions, points, lines, and text. Additionally, the layer contains style overrides and zoom layering characteristics that you can add to give the layer more or less prominence in the Map window.

Figure: Map Layers Example

Map layers form the building blocks of maps in MapInfo Professional. Once you have created your layers, you can customize them in a variety of ways, add and delete layers, or reorder them.

For example, one layer may contain state boundaries, a second layer may have symbols that represent capitals, a third layer might consist of text labels. By stacking these layers one on top of the other, you begin to build a complete map. You can display one, two, or many tables at a time.

Map Objects as Part of Layers

We mentioned earlier that maps in MapInfo Professional are made up of layers of map objects. There are five basic types of objects:

- *Regions*: closed objects that cover a given area. These include polygons, ellipses, and rectangles. For example, country boundaries, postal code boundaries, sales territories.
- *Point objects*: represent single locations of data. For example, customer locations, restaurants, parking meters. Points can also be combined into multipoint objects.
- *Line objects*: open objects that cover a given distance. These include lines, polylines, and arcs. Examples are streets, rivers, power lines.
- *Text objects*: text that describes a map or another object, such as labels and titles.
- *Collection objects*: combination of region, line, and multipoint objects.

You can have each type of object in a separate layer (most common), or you can combine objects in the same layer. MapInfo Professional lets you create, edit, customize, and display these objects to make maps that meet your needs.

For information about drawing and editing map objects, see **Drawing and Editing Objects in Chapter 8 on page 275** and see *Moving Map Objects* in the *Help System*.

Managing a Map's Layers

The key to controlling your map layers is the Layer Control dialog box. The dialog box shows all the layers that make up the current Map window and the status of the layer attributes. These attributes are: visible, editable, selectable, and auto label. The icons above each check box column represent the attributes. ToolTips display over the attribute icons when you move your cursor over them to help familiarize yourself with each icon. It is easy to change a layer's, or multiple layers', attributes using the check boxes.

You also have options available to change the Display and Label settings; modify any thematic maps you have displayed; and reorder, add, or remove layers.

- For instructions on accessing the Layer Control dialog box, see *Accessing Layer Control* in the *Help System*.
- For instructions on changing layer order in the Layer Control dialog box, see *Changing the Order of Contiguous Layers* or *Changing the Order of Random Layers* topics in the *Help System*.

Working with Layers in the Layer Control

The Layer list has multi-select capabilities. To change the order of one or more contiguous layers, hold down the **Shift** key, select the layers, and drag them up or down. To change the order of one or more layers that are out of sequence, hold down the **Ctrl** key, select the layers, and drag them up or down.

When you begin to drag the layers, the cursor will change shape to represent the number of layers being dragged. If you are dragging one layer, the cursor becomes an arrow icon with a single layer icon attached to the top. If you are dragging multiple layers, the arrow icon will display multiple layer icons at the top. If you select layers that cannot be dragged or if you are attempting to insert layers where they cannot be inserted, the cursor becomes a circle with a line through it.

Note: A selection of layers that is out of sequence will become contiguous upon insertion.

You can also use the **Up** or **Down** buttons to move one or more layers. You cannot reorder or remove the Cosmetic layer. It will always be the top layer.

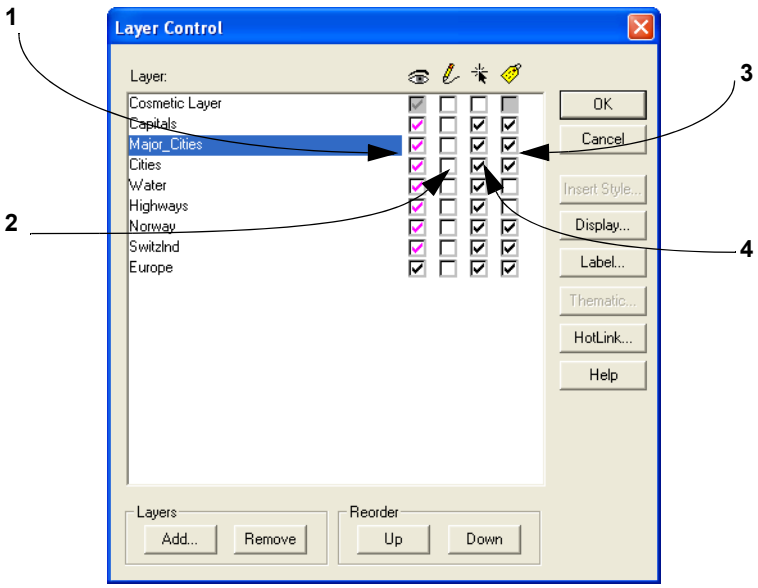
There is ToolTip associated with field entries in the Layer Control dialog box that allows you to view the whole name of the layer you hover over. This is to make it easier to identify the layers in your map. You can change the way ToolTips display in the using the **Map Window Preferences**. Select the **Show ToolTips in Layer Control Dialog** to display the ToolTip message or clear the check box to prevent ToolTips from showing in **Layer Control**. To access the Map Window Preferences dialog box, select **Options > Preferences > Map Window**.

Accessing Layer Control

To access the Layer Control dialog box:

1. In the Map window, do one of the following:
   - On the **Map** menu, click **Layer Control**
   - Click the **Layer Control** button in the **Main** toolbar.

   Use Layer Control to manipulate the layers and their attributes to determine the map display.



***1** Select these boxes to display a layer. **2** Select these boxes to edit a layer. **3** Select these boxes to label a layer automatically. **4** Select these boxes to make a layer selectable in the Map window.*

2. When you have completed your changes, click **OK** to display them on the map.

Adding a Layer to the Map

You can add one layer to the current Map window at a time or use the multiselect functionality to add layers simultaneously.

Note: You can only add layers from tables that are open. If you want to add a layer and you do not see it in the list, make sure the table that contains that layer is open.

- For more information, see *Adding a Layer to the Map* and *Adding Multiple Layers* in the *Help System*.

Reordering Layers

Map layers display in the order that they are listed in the Layer Control dialog box, with the bottom layer drawn first and the top layer (which is always the Cosmetic Layer) drawn last. It is important to order your layers correctly.

For example, you have a layer of customer points and a layer of census tracts. If the layers are incorrectly ordered in the Map window, MapInfo Professional might draw the customer points first and then display the census tract layer second. Your points would be obscured by the census tract layer. You can reorder how layers are displayed in a Map window two ways.

- For more about layers, see *Reordering Layers, Changing the Order of Contiguous Layers* and *Changing the Order of Random Layers* topics in the *Help System*.

Layer order is also important when you use the Select tool. The Select tool selects objects from the topmost Selectable layer. If you have several objects at the same location, it is difficult to select the exact one you want. You can reorder your layers in Layer Control so that the layer you want to select from is the new topmost layer.

MapInfo Professional does not allow you to control the front-to-back ordering of objects within a single map layer. If you are editing a table, and you draw a line on top of a circle, the line might appear in front of or behind the circle; you cannot control whether it is in the front or the back. You can, however, control the front-to-back ordering of objects in a Layout window.

Note: If you need to control the ordering of objects (for example, you need to make sure that your lines display on top of your regions), put the different object types in separate layers. Put your line objects in one table, and put your region objects in another table. Then use the **Layer Control** dialog box to order the layers.

- For more information, see *Removing a Layer from the Map* and *Changing a Layer's Display Options* in the *Help System*.

Positioning and Sizing Labels

Two features in the **Map > Layer Control > Label button > Label Styles** dialog box help you with label placement: Anchor Point and Offset.

To label a map object using the Label tool:

First, make sure that the layer containing the objects you want to label is selectable.

1. Click the **Label** button in the **Main** toolbar.
2. Click on an object with the Label tool to display a label for that object. MapInfo Professional labels the object with the values (from the column that you specified for that layer in the Label Options dialog box.
3. To change label options, choose **Map > Layer Control**. The **Layer Control** dialog box displays.
4. Press the **Label** button. The **Label Options** dialog box displays. Specify the desired label options, (Label Partial Objects, Allow Duplicate Text, Allow Overlapping Text, Styles, Position etc.)

The anchor point is the label's position relative to the map object. Click on one of the buttons in the Label Style dialog box to select an anchor point. You have nine choices.

The anchor point is an ongoing attribute of the label. For example, if you anchor a point object's label at Center Left and you increase the label's font size, the text will grow to the left. This way, the text can never overwrite the point.

The default anchor point varies with the type of map object you are labeling:

- Regions default to Center.
- Lines default to Below Center.
- Points default to Right.

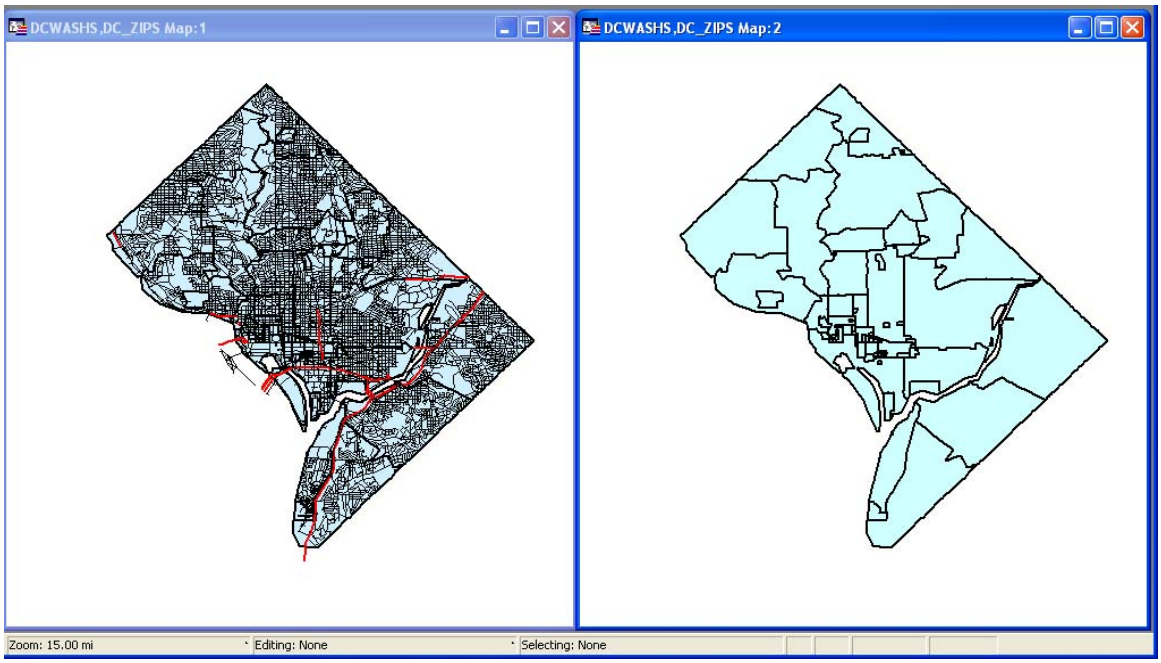
Label offset is how far away a label is from its anchor point. Specify the number of half spaces you want the label to be from the anchor point in the **Label Offset** box.

Label Size

Label size does not change with zoom or scale changes. Labels display at the size you specify at all zoom levels as well as on printed output. Labels are never hidden behind other geographic objects because they are always the last objects drawn on the map.

Setting the Zoom Layering

Sometimes you want a map layer to display only at certain zoom levels. *Zoom Layering* controls the display of a map layer so that it displays only when the map's zoom level falls within a preset distance.



For example, you have a layer of streets and a layer of postal code boundaries. When you zoom out past 10 or so miles, the streets look like a black smudge in the window. This is because the zoom (window width) is too wide to show detailed street maps. Use Zoom Layering to tell MapInfo Professional to display the street layer only when the zoom is set to a distance that allows you to see the street detail properly, for instance, less than 5 miles.

The first map doesn't have zoom layering set for its street layer. At a zoom of 15 miles across, notice how difficult it is to see any detail. The second map has zoom layering set to display the streets when the zoom is less than five miles. Therefore, the streets layer does not display when the window is set at 15 miles.

For more information, see *Setting the Zoom Layering* in the *Help System*.

You can display different layers in the same Map window at different zoom levels. For example, you have a layer of streets, a layer of county boundaries, and a layer of state boundaries. You want the streets layer to be visible only when the zoom level is less than eight miles. You want the county

boundary layer to display when the zoom level falls between 20 miles and 200 miles. You want the states boundary layer to be visible only when the zoom level is greater than 100 miles. You can set a different zoom level for every layer in your Map window.

Note: When you add an object, a region, a line, or a polyline in the Map window and zoom out beyond where the zoom layer would permit you to see that feature, MapInfo Professional turns off zoom layering so you can continue to see what you are working on. When you complete the add process, a message displays asking you if you want to leave zoom layering off (so you will still be able to see the feature). If you click **Cancel**, MapInfo Professional cancels the zoom layering. If you click **OK**, you need to adjust your zoom settings to see this feature again.

For more information, see *Changing a Map's Zoom Level* in the *Help System*.

Displaying the Lines, Nodes, and Centroids

The **Display Options** dialog box allows you to display line directions, nodes, and object centroids. Select the **Show Line Direction** box when you want to show the direction in which line objects are drawn. Check the **Show Nodes** box to display the nodes in a layer.

The **Show Centroids** box displays the centroids of each object in a layer. In MapInfo Professional, a region's centroid does not represent its center of mass. Instead, the centroid represents the location used for automatic labeling, geocoding, and placement of thematic pie and bar charts. If you edit a map in Reshape mode, you can reposition region centroids by dragging them.

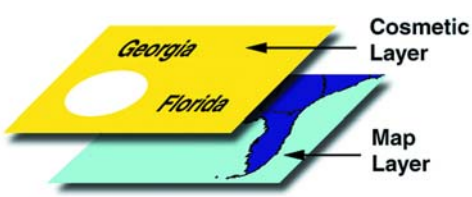
See the Help System for these related topics:

- *Changing a Layer's Labeling Options*
- *Changing a Region's Centroid*
- *Changing a Label's Style*
- *Drawing Autolabels*

For instructions on inserting table-based style in the Layer Control dialog box, see *Inserting Styles into Tables* in the *Help System*.

Understanding the Cosmetic Layer

Every Map window in MapInfo Professional has a Cosmetic Layer. Think of the Cosmetic Layer as the blank transparency that lies on top of the other map layers (transparencies). It can store map titles and other graphic objects you create during a work session. The Cosmetic Layer is always the top layer of the map. You cannot remove or reorder the Cosmetic Layer.



You can only make the Cosmetic Layer editable or selectable. Other Layer Control options (labeling, zoom layering, display mode) are not available for the Cosmetic Layer. To select fill patterns, line types, symbols, and text font for the Cosmetic Layer, use the Line Style, Region Style, Symbol Style and Text Style commands from the Options menu. When the Cosmetic Layer is editable, you can access the style options from the Drawing Toolbar.

The contents of the Cosmetic Layer are linked proportionally to the map. Map objects (except for symbols) and text in the Cosmetic Layer are proportionally linked to the zoom level of the map. If you draw objects in the Cosmetic Layer and then change the map's zoom from 30 to 100 miles, the size of the objects will appear smaller.

See these related topics in the Help System:

- *Using the Cosmetic Layer*
- *Saving Cosmetic Layer Objects*
- *Saving Objects on the Cosmetic Layer*
- *Removing Cosmetic Objects*
- *Disabling the Save Cosmetic Objects Warning Dialog Box*

Making the Layers "Editable"

To make changes to the graphic objects in a layer, you must make the layer editable. You can draw objects on that layer, add text, combine, or delete objects. You can only make one layer editable at a time.

- For specific instructions, see *Making Layers Editable* in the *Help System*.

Making a Read-Only Table "Editable"

If you are working with tables that were opened from Excel, Lotus, or ASCII files, you may have noticed that they come in as read-only tables. Because the files are not in native MapInfo Professional formats or standard DBF format, MapInfo Professional is unable to edit the tabular information contained in these tables.

If you wish to modify the table information, you must save a copy of the table.

- For instructions on making read-only map layers editable, see *Making Layers Editable* in the *Help System*.

Getting Layer Information

You can use the Info tool to get information pertaining to the map layer.

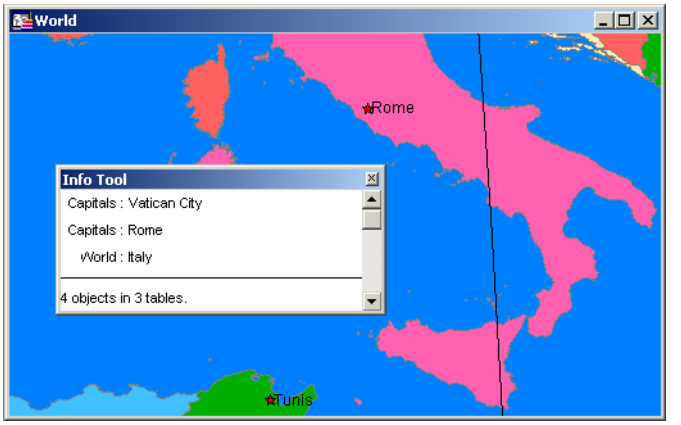
To get information about an object in a particular layer:

1. Make sure the layer you want information about is the selectable layer.

2. Click **Info** in the Main toolbar and click the object you want information about.

   Note: If the information that displays is not what you were looking for, check to see that the layer you are interested in getting data for is selected.

   Using either method, the Info Tool box displays.



   Note: Use the **Ctrl** key with the **Info** tool to toggle through all selectable layers and access overlapping objects.

When you click a map location using the **Info** tool where two or more selectable map objects overlap, the data tied to the objects on each layer display in the Info tool window. If you do not want the information for all layers to display, turn off `Selectable` for those layers in the **Layer Control** dialog box.

You can also view an object's label expression in an InfoTip when you use the Select, Info, or Label tools. InfoTips work very much like ToolTips. Using one of these tools, place your cursor over an object. An InfoTip displays the label expression for the object in the topmost selectable layer. To set InfoTips for a particular layer, adjust the Selectable attribute in the Layer Control dialog box so that the Tips display for the layer you want. InfoTips are active by default, but you can turn them off in the Map window preferences (on the Options menu, point to Preferences and click Map window).

Selecting Objects in a Layer

If you only want to select objects for further analysis rather than edit the objects, make the layer selectable. More than one layer can be selectable at a time. If a layer is editable, it is also selectable.

Many MapInfo Professional functions require that map objects be selected before performing the particular operation. To use the **Select** tool, **Label** tool or **Info** tool you must first make the layer selectable. Unlike the editable feature, more than one layer may be selectable at the same time. You may, however, only select from one layer at a time.

The Select tool selects objects from the topmost Selectable layer. To select an object that is not in the top Selectable layer, you can turn off the Selectable option in Layer Control for every layer above the layer you want to select from. Using the multi-select functionality, you can do this in just a few steps. Select the layers, and select a Selectable check box for one of the layers. The Selectable attribute is cleared for the selected layers. As an alternative, you can leave all layers Selectable and use the Ctrl key in combination with the Select tool to cycle through each Selectable layer.

Note: The instructions for making a layer editable are the same, except that you select the check box in the Editable column instead.

- For instructions on making objects in a layer selectable, see *Selecting Objects in a Layer* in the *Help System*.

For example, if you want to find all customers who live within a fifty kilometers radius of Paris, make the Street layer selectable. If the map also includes a layer of hospitals (which you do not want to include in the radius search), turn off the Selectable option for the hospital layer.

The Editable or Selectable options only apply to the Map window itself. You can always select objects using the Select or SQL Select commands regardless of whether a layer is selectable.

Working with Thematic Layers

When you create a thematic map in MapInfo Professional, the thematic shading is added to your map as a separate layer. It is drawn on top of the layer, from which it gets the raw data.Separating a thematic layers from its base layer provides you with several important options:

- Graduated symbol thematic maps do not require that your base layer contain point objects. Instead, graduated symbol objects are built regardless of the map object type. Therefore, even if your base layer contains region or line objects, you will still be able to create a graduated symbols map.
- You can have multiple thematic layers per base layer. In some cases, you do not have to add another base layer to the map to create another thematic layer. You can display more than one thematic layer at a time, as well as perform bivariate thematic mapping.
- You can use **Layer Control** to turn the display on or off for a given thematic layer. The layer it is based on can continue to display. You can also set individual zoom layers on thematic maps.

Ordering Thematic Layers

To display thematic layers properly, they must be in a specific order. This is especially important when you want to display more than one thematic layer at a time. For example, you would want pie or bar charts for an area map to display on top of regions that are shaded in order to see them.

The following lists the order of map layers from top to bottom (note that map layers are drawn from the bottom up):

1. Pies, Bars, or Graduated Symbol thematic layer.
2. Dot Density thematic layer.
3. Ranged thematic layer – where Color or Size Attributes are applied.
4. Ranged (or Individual Value) thematic layer – where All Attributes are applied.
5. Major layer or base layer.
6. Grid thematic layer.

When you create a new thematic layer, MapInfo Professional automatically inserts it into its proper place.

- For more information, see *Reordering Thematic Layers* in the *Help System*.

Displaying Thematic Layers

You can turn the display on and off for thematic layers the same way you can for other map layers. All the display settings in Layer Control are also applicable to thematic layers, enabling you to set a zoom level for each thematic layer. You can also access the Modify Thematic Layer dialog box through Layer Control by clicking the Thematic button.

Thematic layers are always drawn after their base layer. Therefore, they appear above their base layer in the Layer Control list, and are indented to distinguish them from other map layers.

Thematic layers are displayed in the list with this naming convention:

```
<Thematic type> with/by <variable-list>
```

The type of thematic map is noted first, followed by the list of variables used to create the map. For example, a pie thematic layer that uses commuting data is listed this way:

```
Pies with ComAlone, ComCarpool...
```

The variable list is truncated if there is not enough room to display each variable used in your thematic analysis. For more information about thematic mapping, see **Using Thematic Mapping to Analyze Information in Chapter 10 on page 340**.

Converting Objects into Region Objects

When you convert a circle or ellipse into a region, the region contains 101 nodes. When you convert an arc into a region, the number of nodes depends on the starting and ending angle of the arc. If the arc spans 180 degrees (for example, the starting angle is zero and the ending angle is 180), a region based on the arc will contain 52 nodes; if the arc spans 90 degrees, a region based on the arc will contain 27 nodes; etc.

If you perform extensive map editing, you may need to convert polylines to regions. If you cut or copy a group of selected nodes, MapInfo Professional treats the set of nodes as a polyline object, and places the polyline on the clipboard. If you then paste the object, MapInfo Professional places the polyline on your map. At this point, you may want to perform Convert to Regions, depending on whether you want the finished object to be a region.

Convert to Regions also allows you to perform node-editing operations (for example, adding and moving nodes) on objects that ordinarily do not allow node editing. For example, MapInfo Professional does not allow you to add nodes to rectangle objects; however, if you convert a rectangle object to a region, you can then add nodes to the region.

To convert objects into region objects:

1. Make the Map window active.
2. Choose the layer containing the objects and make it editable.
3. Select one or more objects from the editable layer.
4. Choose **Objects > Convert to Regions**.

   When you choose **Convert to Regions**, MapInfo Professional converts each of the selected objects into a region object. Each object is converted into a separate region; MapInfo Professional does not combine all selected objects into one region. To combine objects, use the **Combine** command.

   MapInfo Professional automatically assigns the current region style to each of the region objects. To specify a region style, choose **Options > Region Style**.

   Line, polyline, arc, ellipse, rectangle, and rounded rectangle objects may all be converted to regions. The **Convert to Regions** command does not affect point objects, text objects and region objects.

- For more information, see the C*reating Regions from Polygonal Areas Enclosed by Polylines* topic in the *Help System*.

Working with Raster and Grid Layers in Layer Control

A raster image is a type of computerized image that consists of row after row of tiny dots (pixels). If you have a scanner and scanner software, you can create a raster image by scanning a paper map. After you scan a map image and store the image in a file, you can display the file using MapInfo Professional.

In contrast, vector images contain coordinate-based data structures represented by x and y coordinates (most of MapInfo Professional's data is in vector format).

The Help System contains these related topics:

- *Displaying a Raster Image*
- *Registering the Coordinates of a Raster Image*
- *Working with Raster Images*
- Changing the Display of a Raster Image

Converting Grid Files to MapInfo Professional Grids (*.mig)

The Grid Tools (Create MapInfo Grid from Table of Objects and Create MapInfo Grid from Other Grid Files) In MapInfo Professional allow you to convert Grid Files to MapInfo Professional Grids (*.mig). These tools convert any grid file for which there is a grid handler present with the output being in MapInfo Professional (*.mig) format. You can apply relief shading from a user-specifiable virtual light source and control the color inflection values. The color files are simple text files that you can edit to specify the color inflection values by specific value or as a percentage of the range of data values. You can open and display the new grid after the conversion.

- For specific instructions, see *Converting Grid Files to MapInfo Professional Grids and Specifying Inflection Values with the MapInfo Professional Grid Converter in* the *Help System*.

Adjusting the Translucency of a Grid Thematic Map

The Translucency slider control in the Modify Thematic Map dialog box allows you to control the percentage that layers show through raster images. A translucent image allows you to partially *see through* the image. Translucent images can be layered on top of other layers so that the lower layers are partially visible through the image.

Note: The Grid Appearance dialog box allows you to specify color inflection distribution options for grid maps.

- For specific instructions, see *Adjusting the Translucency of a Grid Thematic Map* in the *Help System*.

Working with Seamless Layers

Use or create a seamless map layer to treat a group of base tables as if they were one. A seamless layer allows you to change display attributes, apply or change labeling or use the **Layer Control** dialog box for an entire group of tables at once. You can also retrieve information using the Info tool, and select or browse any one of the layer's base tables. A base table can be any regular MapInfo Professional table. Grid layers cannot be made seamless.

This feature is especially useful when you want to display a vector or raster backdrop for your maps such as joining street or boundary maps. For example, you may have a seamless layer of county boundaries made up of several individual county tables.

Features Available with Seamless Layers

Since a seamless layer is actually made up of *several* base tables, MapInfo Professional does treat it a little differently than a regular MapInfo Professional table. You can use the following MapInfo Professional features with a seamless map layer:

- **Layer Control**
  Use any of the functions except Thematic Mapping from the Layer control dialog box on your seamless layer. Add, Remove, or Reorder layers or set Display, Zoom Layering or Label options for the seamless layer (*all* base tables) at one time. However, you cannot make a seamless layer editable.
- **Info Tool**
  Retrieve information about a particular object in a base table.
- **Select Tools**
  Select objects from the seamless layer. You can only select a group of objects if they reside in the same base table. Press the Shift key while clicking the Select Tool to do so. If you attempt to select several objects that reside in different base tables, MapInfo Professional will only select objects in one base table. If you use the Marquee or Radius select tools and the selected area spreads across two different base tables, MapInfo Professional selects the table in either the center of the circle or polygon.
- **Browse Table**
  Display a Browser window of a particular seamless table. You are prompted to select a base table.

Turning Seamless Layers On and Off

If you need to edit the structure of your seamless layer, you'll need to turn your seamless layer off.

To turn your seamless layer off:

1. Choose **Options > Show MapBasic Window**. The MapBasic Window displays.
2. Type set table "tablename" seamless off. MapInfo Professional turns off the seamless layer.
3. Display the table in a browser to view or edit its table structure. If you edit the table structure, you will need to recompile the seamless layer.

MapInfo Professional turns off the seamless layer. Display the table in a browser to view or edit its table structure. Use the Seamless Table Manager to add or create seamless tables.

To turn the seamless layer on:

1. Choose **Options > Show MapBasic Window**. The MapBasic Window displays.
2. Type set table "tablename" seamless on. MapInfo Professional turns the seamless layer on again.

Opening a Seamless Map Layer

MapInfo Professional includes sample seamless maps or you can create your own. Some of these data files are available on the MapInfo web site in the MapInfo Professional Tutorial data. We recommend you download this data for use with these examples.

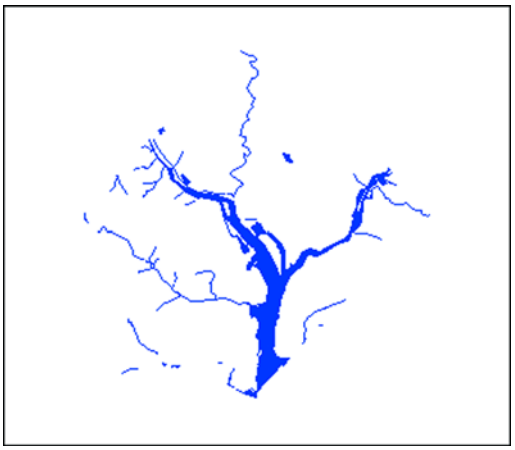
From the **mapinfo\tutorial\tut-usa\usa\dc\seamless** directory, choose **dcmetrow**. A seamless map layer of water areas in Washington DC displays. Notice at first glance that the seamless layer looks like any other MapInfo Professional table. However, the **Dcmetrow** seamless map layer is made up of the following base tables:

- **vaarliw.tab** (Arlington Virginia water areas)
- **vaalexw.tab** (Alexandria Virginia water areas)
- **dcwashw.tab** (Washington DC water areas)

To display a sample seamless map:

1. On the **File** menu, click **Open**.
2. From the data directory, choose DCWATER.

   The following seamless map layer of water areas in Washington DC displays.



The structure of each seamless layer includes the path name of each base table plus a description that defaults to the table name (alias). To view the table structure, turn the seamless layer off and display the seamless table in a browser. Refer to *Turning Seamless Layers On and Off* in the *Help System*.

Characteristics of a Seamless Layer

Since a seamless layer is actually made up of *several* base tables, MapInfo Professional does treat it a little differently than a regular MapInfo Professional table. You can use the following MapInfo Professional features with a seamless map layer:

- *Layer Control*. Use any of the functions except Thematic Mapping from the Layer Control dialog box on your seamless layer. Add, Remove, or Reorder layers or set Display, Zoom Layering or Label options for the seamless layer (*all* base tables) at one time. However, you cannot make a seamless layer editable.
- *Info Tool*. Retrieve information about a particular object in a base table.
- *Select Tools*. Select objects from the seamless layer. You can only select a group of objects if they reside in the same base table. Press the **Shift** key while clicking the Select Tool to do so. If you attempt to select several objects that reside in different base tables, MapInfo Professional

will only select objects in one base table. If you use the Marquee or Radius select tools and the selected area spreads across two different base tables, MapInfo Professional selects the objects in the center of the circle or polygon.

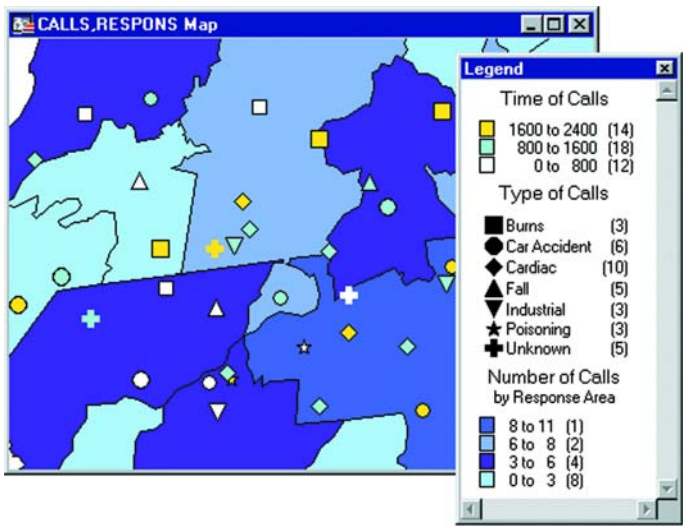
- *Browser Table*. Display a Browser window of a particular seamless table. You will be prompted to select a base table.
- For more information, see *Creating/Compiling a Seamless Layer* in the *Help System*.
- For more about Seamless Layers in general, see the MapInfo Professional *Help System*.

The Help System contains these related topics:

- *Experimenting with a Seamless Layer*
- *Specifying Search Paths for Component Tables of a Seamless Layer*
- *Turning Seamless Layers On and Off*

Data – Where MapInfo Professional Begins

To use MapInfo Professional, you need to match the files that contain your information (*data*) and maps that come from MapInfo Professional or that you create yourself. MapInfo Professional organizes all its information, whether textual or graphic, in the form of tables; each table is a group of MapInfo Professional files that constitute either a map file or a database file.



Emergency medical calls thematically shaded by type of call and time of call, with response zones shaded by number of calls.

MapInfo Professional begins when you open tables, whether they are maps or data from a database.

What Is a Database and Other Basic Terminology

A *database* is a collection of information organized so that it can be readily accessed using a computer. Databases in MapInfo Professional are often referred to as tables.

To understand MapInfo Professional, you need a basic understanding of database organization, in particular, three fundamental concepts: *record*, *field*, *index,* and *query*.

LastName	FirstName	Address	ZIPCode
Fraser	Mark	212 Hudson St	12205
Donaldson	Eva	459 Yates St	12208
Espinosa	Kim	200 Broadway	12180
Smith	Charles	1 Redbird Ln	12065
Chang	Elizabeth	53 Crescent Rd	12077

To understand the database concepts we are about to discuss, consider the table above.

Each row in the list contains information about one person. In database terms, each row is a *record*. Each different box of information (Last Name, First Name, etc.) within a record is called a *field*. Fields correspond to the columns so that the table shown above contains four different fields.

Database fields are ordered (first, second, third, fourth, etc.), and the basic convention is that the first field displays as the first column in the database. The second field is in the column to the right of the first, and so on to the last field, which is displayed in the right most column.

Since the data in a database isn't usually in alphabetical order or postal code order or any other pattern which would make it easy for the computer to find the information, the computer needs a way to organize the information. A database uses an *index* to keep track of what information is where and what record it is tied to. Without indices it would be tedious to find anything in a database with hundreds of records, not to mention databases with thousands and tens of thousands of records.

A database index works on the same principle as a book index. A book index is an alphabetical list of topics that appear in the book and the page number or address of the information. Database indices work in a similar way, except that they generally work behind the scenes. You don't ever see them. But the computer constructs them and allows you to use them in your work. An index allows the computer to work with the records according to the order of items in the key field.

MapInfo Professional requires fields to be indexed in order to use the Find command. Indices are also used to improve performance in SQL Select and joins.

A *query* is just another word for a question. You query data to collect a particular type information from your database. For example, if you wanted to know how many customers live within a certain number of miles of your store, (and you had that kind of information in your database), you could query the database to find out that information. The result of the query is *query data*. You can think of query data as a subset of your data as in the example — a list of all the customers within 5 miles and none of the customers who live further away. MapInfo Professional has tools to help you query your data and display it on a map. For more about querying your data, see **Selecting and Using Queries in Chapter 9 on page 310**.

What Data Can I Use in MapInfo Professional?

MapInfo Professional allows you to use data that was created in other file formats. When you bring data into MapInfo Professional for the first time, you need to specify its format. For example, if your data is in delimited ASCII format, choose **Delimited ASCII** from the **File Format** drop-down list.

Data file choices include:

- Microsoft Access
- Microsoft Excel
- dBASE DBF
- ESRI ® shapefiles
- Raster Image
- Grid Images
- ASCII Delimited Text
- Lotus 1–2–3
- Remote Databases (Oracle, Informix, SQL Server, etc.)
- Workspace
- Comma Delimited CSV files

When you choose a particular file format, the File Name box will only list files that have the appropriate extension. For example, if you choose **dBASE DBF** from the **File Format** drop-down list, MapInfo Professional will only list files that are in dBASE format.

When you choose a file other than a MapInfo-formatted file type, MapInfo Professional creates a table structure for that data based on the type of file that it is.

Note: During the .TAB file creation process, the original file is in no way altered. The file retains its original properties.

When you open that table in future work sessions, MapInfo Professional will treat these files as if they were in MapInfo Professional's native format. The next time you want to open the table, you should choose the .TAB format for the table. If you accidently attempt to open the file again with its original file format, MapInfo Professional prompts you with the message:

```
Table definition already exists. Overwrite it?
```

This message displays because MapInfo Professional has already created a table for that file. To use the file you have already created, press **Cancel** and open the associated .TAB file.

Also keep in mind that MapInfo Professional supports long filenames and UNC paths. The UNC paths allow you to access your data without having to remember your drive mappings from one session to another.

To display your table in the Map window, your data must contain X and Y coordinates. If it doesn't already, you can add them using MapInfo Professional. Assigning these coordinates is called geocoding. More about geocoding follows later in this chapter and in **Putting Your Data on the Map in Chapter 5 on page 199**.

The *Help System* contains these related topics:

- **Displaying your Excel (.XLS) Data**
- **Displaying your Access (.MDB) Data**
- **Displaying your Comma Delimited Data**

- Displaying your dBase Data
- Displaying your Lotus 1-2-3 Data
- Displaying your ESRI Shapefile Data
- Registering and Displaying your ASCII Data
- Importing and Displaying GML File Data
- Displaying Your Remote DBMS Data
- Displaying and Importing Data from a Web Map Service

Support for Raster Images

MapInfo Professional supports raster image display. Raster images are computerized pictures. These graphic images can be used as backgrounds for maps you create in MapInfo Professional and can serve as a reference for your displayed data.

When you bring in a raster image to MapInfo Professional, you may need to register it (specify its map coordinates) so MapInfo Professional can display it properly. Choosing the Raster Image file format from the **Open** dialog box will bring you to the Image **Registration** dialog box where you can specify the appropriate map coordinates. Once you register the image, a process that creates a .TAB file for the image, you can open it as you would open any table in a Map window. Images that you purchase from MapInfo Professional will already be registered.

If a raster image is georeferenced it will be automatically opened. If a raster image has an associated world file, you will be prompted to choose the projection. If you open a raster image that does not have any georeferencing data, you will be prompted to display or register the image.

- For a full discussion of raster image display, see *Registering SPOT Images* in the *Help system*.

The MapInfo Professional raster handlers support:

- LeadTools to version 15
- MrSID SDK (3.2), to provide support for MG3 files
- Multi-threading; specifically for ECW and the Government handlers (ADRG, ASRP, CADRG, CIB, NITF)

AirPhotoUSA provides raster images at different elevations for particular areas in the United States. The AirPhotoUSA map handler allows MapInfo Professional users to open and display the imagery contained in AirPhotoUSA Map files as a layer. These files are treated just like any other raster file in MapInfo Professional. The MAPINFOW.PRJ file contains AirPhotoUSA information.

You can use the AirPhotoUSA Conterminous U.S. coordinate system without making any changes. However, if you want MapInfo Professional to recognize and give a name to that coordinate system, or to use it for other purposes, you must add it to the MAPINFOW.PRJ.

Understanding the Files Associated with MapInfo Professional Tables

When you open your data file, MapInfo Professional creates a table. This table consists of at least two separate files. The first file contains the structure of the data. The second file contains the raw data. All MapInfo Professional tables have the following two files:

- <SOMEFILE>.tab: This file describes the structure of your table. It is a small text file describing the format of the file containing your data.

- <SOMEFILE>.DAT or <SOMEFILE>.WKS, .DBF, .XLS: These files contain your tabular data. If you are working with a dBASE/FoxBASE, delimited ASCII, Lotus 1–2–3, Microsoft Excel, or Microsoft Access file, your MapInfo Professional table will consist of a .TAB file and your data or spreadsheet file. For raster tables, the equivalent extension might be BMP, TIF, or GIF.

Your data may also contain graphic objects. Once you assign X and Y coordinates to your data records, your table will also contain graphic objects. In **Geocoding – Assigning Coordinates to Records in Chapter 5 on page 211**, you will learn how to assign X and Y coordinates to your data records so you can display them on a map. If you already have graphic objects in your table, there are two more files associated with the table:

- <SOMEFILE>.MAP: This file describes the graphic objects.
- <SOMEFILE>.ID: This file is a cross reference file that links the data with the objects.

For a Microsoft Access table, there will be a file SOMEFILE.AID associated with the table instead of SOMEFILE.ID. This file is a cross reference file that links the data with the objects for a Microsoft Access table.

Your table may also include an index file. The index file allows you to search for map objects using the Find command. If you want to locate an address, city, or state using the Find command, those fields must be indexed in your table. The index is located in:

- <SOMEFILE>.IND

Opening Your Data in MapInfo Professional

You can open your Excel (.XLS), dBase (.DBF), Microsoft Access (.MDB), and ASCII (.TXT) in MapInfo Pro and display that data on a map. There are three steps to accomplishing this:

1. Creating a copy of your data in MapInfo format.
2. Creating points on a map using either coordinates in your data or by matching your data to a search file (see **When Do I Geocode vs. Create Points? in Chapter 5 on page 200** for this process).
3. Display your data on the map (see **Displaying your Data on a Map in Chapter 5 on page 200** to complete this process).

If you are accessing your data remotely or use SpatialWare or other ODBC supported database product, see **Understanding Remote Tables and Databases in Chapter 7 on page 248**and *Working with the MapBasic Window* in the MapInfo Professional *Help System* for additional support. For more information about converting, displaying, and printing your data, see **Understanding Your Data in Chapter 8 on page 273**.

Opening MapInfo Tables

To work with the data in your database, you open the file or table that contains the data. MapInfo provides some free introductory data you can open as soon as you get MapInfo Professional.

Note: When you open a table and select a new Preferred View from the drop-down list, MapInfo Professional remembers your selection and uses it the next time you open a table.

- For instructions on opening the free introductory data provided by MapInfo, see *Opening the MapInfo Professional Introductory Data* in the *Help System*.

To open a local table:

1. On the **File** menu, click **Open**. The **Open** dialog box displays.

   Note: If you are at the **Quick Start** dialog box (the first dialog box you see after starting MapInfo Professional), choose the **Open** button. The **Open** dialog box displays.

2. Navigate to the data file you want to open. Use the **Files of type** drop down to select the type appropriate for your data.

3. Select the view you want of this data from the **Preferred View** drop-down list.

   - **Automatic** – MapInfo Professional chooses the most appropriate view. If the data is mappable (i.e., graphic objects are attached to the data), for example, MapInfo Professional opens the table in a Map window. If you have a Map window displayed and the table you want to open is mappable, MapInfo Professional will automatically open the table in the current Map window. If the data is not mappable, MapInfo Professional will attempt to open the table in a Browser window. If the table cannot be mapped or browsed, MapInfo Professional opens the table using the No View option (no data is displayed).
   - **Browser** – MapInfo Professional attempts to open the table in a Browser window.
   - **Current Mapper** – MapInfo Professional attempts to add your data to the current Map window.
   - **New Mapper** – MapInfo Professional attempts to open the table in a new Map window.
   - **No View** – MapInfo Professional opens the table, but no data is displayed.

   Note: When you open a table and select an option in the **Preferred View** drop-down list, MapInfo Professional remembers what you selected and uses the same option the next time you open a table.

4. Select the **Create copy in MapInfo format for read/write** to open it in native (.tab) format.

   Note: If you do not select the **Create copy...** check box, the file opens read-only.

5. To open the file, do one of the following:

   - Double click the file you want to open
   - Click the file you want to open to highlight it in the list and click **Open**.

   Using either method, MapInfo Professional opens the data file.

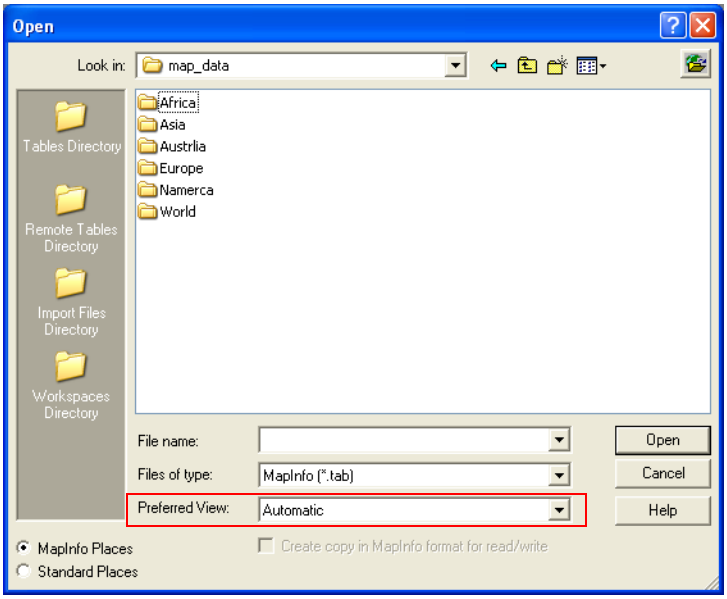
Note that although an MapInfo Professional table consists of two or more component files (STATES.tab, STATES.DAT, STATES.MAP etc.), only the .TAB file appears in the **File Name** box of the **Open** dialog box. It is the only component file you must open. For more about these other MapInfo file types, see **Understanding the Files Associated with MapInfo Professional Tables in Chapter 4 on page 178**.

In MapInfo Professional you can work with a variety of table types. Some data tables are like the example table we just discussed. Further subdividing this class of tables are data tables that contain graphic objects (map objects) and data tables that do not (such as spreadsheets or external database tables). Raster tables are graphic images that you can display in a Map window. These computerized pictures do not have the same table structure of record, field, and index as data tables do, and therefore, will not be discussed in this chapter. For more on raster images, see *Working with Raster Images* in the MapInfo Professional *Help System*.

You can see what windows are currently open by reviewing the list at the bottom of the **Window** menu. If one of these “More Windows” windows is the active window, the check box displays beside the More Windows entry. To make another window active, click the entry in the Window list. The window you selected comes to the forefront of the MapInfo Professional screen. When you select the More Windows entry, the **Select Window** dialog box displays. To activate a window from this list, either double-click the entry in the **Select Window** list, or click the entry and click **OK**.

A Note about the Preferred View Options

Of the five Preferred View options, **Automatic** and **No View** will work on all tables, regardless of what kind of data they contain. MapInfo Professional attempts to open the table as specified for **Browser**, **Current Mapper**, and **New Mapper**.



Of the five Preferred View options, **Automatic** and **No View** will work on all tables, regardless of what kind of data they contain. MapInfo Professional attempts to open the table as specified for **Browser**, **Current Mapper**, and **New Mapper**. If it cannot, it will open the table according to the following rules:

- If **Current Mapper** is selected, and there is no Map window displayed, MapInfo Professional will attempt to open the table in a new Map window.
- If **Current Mapper** or **New Mapper** is selected and the data is not mappable, MapInfo Professional will try to open the table in a Browser window.
- If the table cannot be mapped or browsed, MapInfo Professional will open the table using the **No View** option (no data is displayed).

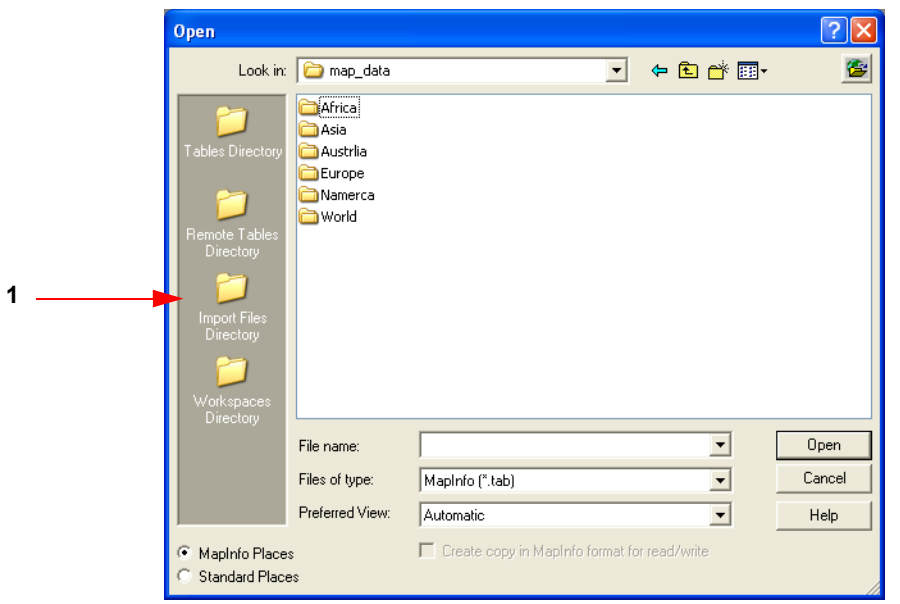
For more information, see *Renaming a Table* and *Deleting a Table* in the *Help System*.

Opening Data in Remote Tables

MapInfo Professional also enables you to access remote database data through its ODBC connectivity support and the Oracle Spatial Object support. The MapInfo Professional ODBC connectivity support supplies many ODBC drivers that you can easily install. Oracle spatial databases enable you to store spatial objects with your conventional data in the same database. This enables you to read and write geographies in Oracle Spatial without the need for a middleware product such as MapInfo Professional's SpatialWare, or SDE. You also gain better performance through the Oracle Call Interface (OCI). In addition, Oracle applications can use this same spatial or non-spatial data through other interfaces (ODBC, OCI, JDBC, PL/SQL, HTTP, IIOP, etc.) or use other spatial or non-spatial tools (MapInfo Professional, ArcView, Intergraph, Excel, Forte, Formida, etc.). For more about accessing remote data using ODBC connectivity, see *Setting your Database Connection Preferences* in the *Help System*.

Using the MapInfo Places on Open Dialog Box

The **Open** dialog box provides a quick way to look for maps you have created.



***1** The Places box. Select the **Workspaces Directory** option in the **Places** box, to display the **Workspace (.wor)** type in the **Files of Type** list. If you select any other entry in the **Places** box, **MapInfo (.tab)** displays in the **Files of type** list.*

The **Open** dialog box provides many ways to quickly find the maps that you have created in a variety of locations in your system and network.

Note: The **Places** box on the left side of the **Open** dialog box allows you to select a directory in which you may have your map and other MapInfo Professional tables and workspaces.

When you select the **Workspaces Directory** option in the **Places** box, the **Files of type** drop-down list changes to Workspace (.wor) type. If you select any other entry in the **Places** box, MapInfo (.tab) displays in the **Files of type** list.

- For more information, see *Opening MapInfo Professional Introductory Data* in the *Help System*.

Opening Special File Types

There are additional file types that MapInfo Professional can read including rasters, grids, shape files. For details about working with raster images, see *Displaying a Raster Image* and *Registering the Coordinates of a Raster Image* in the *MapInfo Professional Help System*.

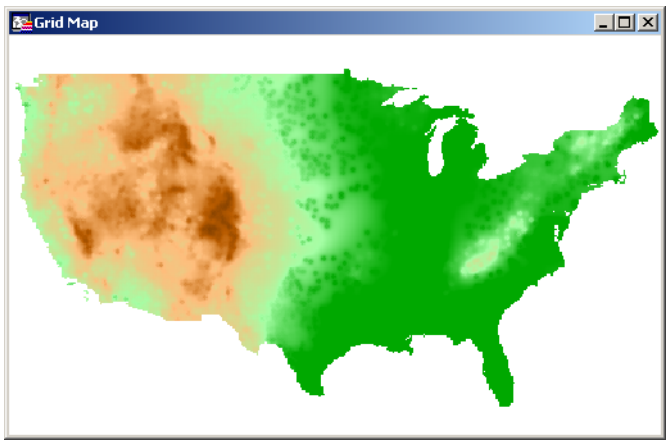
Opening a Grid Layer

A grid layer is a type of thematic map that displays data as continuous color gradations across the map. To produce this type of thematic map, you interpolate point data from the source table. In MapInfo Professional, a grid file from the data interpolation is generated and is displays as a raster image in a Map window.

- For more information, see *Selecting Point Objects in Grid Files* in the *Help System*.

To open a grid layer:

1. On the **File** menu, click **Open** to display the **Open** dialog box.
2. Select **Grid Image** in the **Files of type** drop-down list.
3. Navigate to the directory in which your grid image is located and click the file you want to open.
4. Click **Open** to display the grid image.



Reviewing the Windows in MapInfo Professional

MapInfo Professional allows you to display your data in many different windows and with different views at the same time. For instance, you can display the WORLD table of country boundaries in a Map window to view the geographic boundaries. At the same time you can display the tabular data of the WORLD table in a Browser window to see the country names, population, and other data in the file. If you make a change in either window, it is reflected in the other.

Only one view can be active at a time. To make a different window active, click its title bar. Notice that the menu bar changes depending on which window is active. For instance, when you are working in a Map window when you also have a Browser open, only the **Map** menu is available on the menu bar. Make the Browser active. The **Browse** menu replaces the **Map** menu.

There are many different types of windows you can display your data in, depending upon what you need your data to communicate. This section covers the many ways you can display your data using MapInfo Pro. Each of these display methods: map, list, graph, and presentation give your information a different impact. How you display the information you have should depend upon what effect you want.

Consider these options carefully before you select a display type.

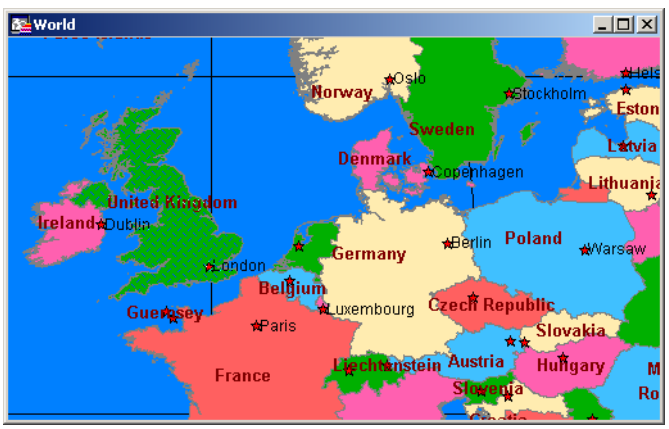
- **Map windows** present information arranged as conventional maps, allowing you to visualize the geographic patterns of your data.
- **Browser windows** present information as tabular lists (just as conventional databases do), allowing you to fully examine tabular data.
- **Graph windows** present information arranged as graphs, allowing you to visualize and make comparisons of the purely numerical patterns.
- **Layout windows** present information in a polished and attractive way and can be embedded in other applications such as Microsoft Word or PowerPoint.

Displaying Data in a Map Window

You use Map windows to display the geographic objects from your table on a map. Map windows can display information from many tables at once, with each table a separate layer.

Opening a Table in a Map Window

You can create your maps or edit existing maps. You can open a Map window directly on the **File** menu, by clicking **Open** or by selecting **New Map window** from the **Window menu**.



Getting Around in the Map Window

There are a wide variety of tools that allow you to zoom, pan, and move objects around the Map window. Zooming allows you to look more closely or more widely at a particular geography. Panning allows you to move around a map left, right, up, and down. Moving selected objects in an editable layer is useful when you want to get your map right.

You can zoom using the mouse wheel or using the keyboard. For more about zooming using the mouse wheel, see *Using the Microsoft IntelliMouse to Move Around the Windows* in the MapInfo Professional *User Guide Help System*.

In addition to the usual zoom keys on your Main Toolbar (, , and), you can use the + and - keys on the keyboard, to zoom in and out more precisely.

- When you press +, you zoom in by a factor of 2.
- When you press -, you zoom out by a factor of .5.

You can pan in your Map window using the scroll bars or the **Arrow** keys **Up**, **Down**, **Left**, and **Right**.

Further, you can move an object in an editable layer more precisely by selecting it and using the following key combinations.

- <**CTRL + Arrow**> - moves the editable, selected objects 1 pixel at a time
- <**CTRL + Shift Arrow**> - moves the editable, selected objects 10 pixels at a time

Note: These tools also apply to the Layout window.

Changing a Map's Zoom Level

You change a map's zoom level by specifying certain parameters in the Change View dialog box.

To change a map's zoom level do one of the following:

- Choose **Map > Change View**. The **Change View** dialog box displays.
- Click the **Change View** button on the **Main** toolbar. The **Change View** dialog box displays.

The Change View dialog box allows you to set various parameters of the map including:

- Display the current zoom, scale or cursor position in the status bar (the default unit of distance is miles which is specified in Map > Options).
- Change the zoom, scale, and the center point of the current map view.
- Behavior of the map when you resize the window.
- Resize the map to fit the new window, keeping the view the same.
- Set the map to preserve the current scale, so that resizing the window has the effect of letting you see more or less of the map.

The Help System contains the following related topics:

- *Opening MapInfo Professional Introductory Data*
- *Setting Margins for a Map Window when Printing*
- *Editing Text in a Map or Layout*

Displaying Data in a Browser Window

You use Browser windows to view and manipulate your data records in traditional row and column form, typically used in spreadsheets and databases. Each column contains information about that particular field, such as name, address, phone number, cable ID number, or order amount. Each row contains all information relating to a single record.

- For more information, see *Displaying Data in a Browser Window* in the *Help System*.

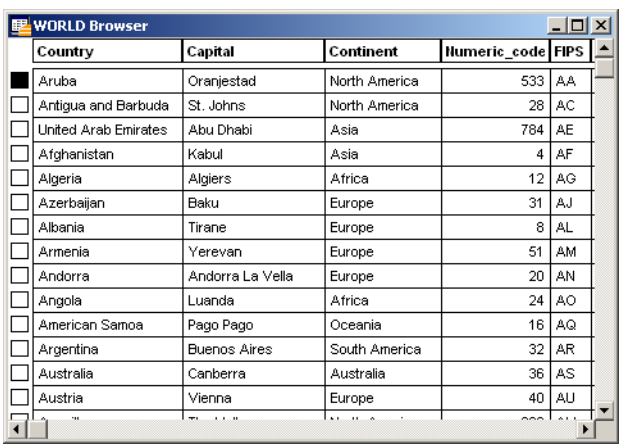
About the Browser Format

If you have ever worked with spreadsheets or databases, you are probably familiar with the Browser format. Each row of the table contains one record, and each column in the record contains information about a particular field (e.g. last name, street address, order number, price, and so forth). The name of the table appears in the Browser window's title bar. Column titles appear directly below the Browser window title bar, appearing as headings. You select a row by single clicking the empty box appearing to the left of that row.

The Status Bar appears at the bottom left of the MapInfo Professional window. This bar displays the range of records currently displayed within the Browser window out of the total number of records in the table.

Opening a Table in a Browser Window

You can edit records in your table, copy records, add new ones, or delete existing records. To open a Browser directly, on the **Window** menu, click **New Browser** Window.



Country	Capital	Continent	Numeric_code	FIPS
Aruba	Oranjestad	North America	533	AA
Antigua and Barbuda	St. Johns	North America	28	AC
United Arab Emirates	Abu Dhabi	Asia	784	AE
Afghanistan	Kabul	Asia	4	AF
Algeria	Algiers	Africa	12	AG
Azerbaijan	Baku	Europe	31	AJ
Albania	Tirane	Europe	8	AL
Armenia	Yerevan	Europe	51	AM
Andorra	Andorra La Vella	Europe	20	AN
Angola	Luanda	Africa	24	AO
American Samoa	Pago Pago	Oceania	16	AQ
Argentina	Buenos Aires	South America	32	AR
Australia	Canberra	Australia	36	AS
Austria	Vienna	Europe	40	AU

To create a report of your data, use the Crystal Reports functionality included in MapInfo Professional (on the **Tools** menu, click **Crystal Reports**).

- For more information, see *Opening Multiple Browsers, Scrolling through a Table,* and *Using the Select Tool to Edit Browser Entries* in the *Help System.*

How a Browser Displays in a Layout

A Browser window displays with the column headings at the very top of the frame. Immediately below, it displays the contents of the table, starting with the row and column at the upper-left corner of the table. It displays as many columns and rows as it can fit in the frame, regardless of how many are displayed in the table. When you resize the frame, the number of rows and columns displayed are adjusted accordingly. However, fields removed from the table with the Pick Fields command are not displayed in a table frame.

The number of rows and columns that can be displayed in a frame depends on font size and column width. The frame displays Table text using the font style and size for that Browser window. When you want a different type style in the frame, you have to make the change in the Browser window using **Options > Text Style** dialog box. When you use smaller type, you can get more rows and columns in a frame.

You can also manually adjust column width in a Browser window without affecting the underlying field size for the base table. You do this by clicking and dragging the short vertical bars separating the column names in the Browser window.

The Help System contains the following related topics:

- *Adding a New Row to a Browser*
- *Adding and Editing Text in a Browser*
- *Adding Fields to a Browser*
- *Choosing a Font for your Browser*
- *Creating a Default Browser View*
- *Preserving Column and Expression Settings in a Browser Window*
- *Removing Fields from a Browser*
- *Resizing a Browser's Columns*
- *Setting Margins for a Browser Window when Printing*
- *Showing or Hiding a Browser's Grid*
- *Using the HotLink Tool in a Browser Window*

Changing a Record's Data, Font, and Style

The **Info** tool allows you to choose an object or row and see a window displaying information from the table about that object. Click another object with the **Info** tool and its information appears in the same window. Click the **Ctrl**-menu box [Close box] of the Info window to make it disappear.

Mouse Wheel Support for Browser Window

When you are working in the Browser window, you can use the mouse wheel to scroll through the records. Roll the mouse button down to scroll down the list, and roll the mouse button up to scroll up the list. You can use the **Tab** key to scroll right and the <**Shift Tab**> keys to scroll left in the Browser window.

Displaying Data in a Graph Window

The Graph window allows you to visualize statistical relationships in graph format. You can create many different kinds of graphs: 3D, bar, line, area, histogram, scatter, bubble, and pie graphs. You can also choose from a number of different graph templates.

To display a table as a graph:

1. From the **File** menu, click **Open** and select the table that you want to display as a graph.
2. Choose **Window > New Graph Window**. The **Create Graph Step 1 of 2** dialog box displays.
3. Choose the chart type and the template for your graph.
4. Click **Next**. The **Create Graph Step 2 of 2** dialog box displays.
5. Choose the field, or create an expression that contains the data values fields that you want used when creating your graph.

   Note: For more information about using the graph features of MapInfo Professional, see *Graph Help System available by selecting Help > MapInfo Graphing Help Topics.*
6. If you want labels for your graph, choose the column that the records are to be labeled with.
7. Choose how you want your graph data organized in rows or series.
8. Click **OK** to display a Graph window.

After the graph displays you can invoke one of several editing dialog boxes to modify an extensive array of attributes. You can also move and resize objects within the graph window until the desired graph is achieved.

The *Help System* contains these related topics:

- *Editing a Graph*
- *Saving a Graph*
- *Saving a Graph Window as a Template File*
- *Setting Margins for a Graph Window when Printing*
- *When Should I use Label Axis Options?*
- *When Should I use Value Axis Options?*

Displaying Data in a Layout Window

The Layout window allows you to combine Browsers, Map windows, Graph windows, and other graphic objects into one layout which can then be sent to a printer or plotter. You use this type of window to create presentation graphics. Layout windows have scroll bars at the right and at the bottom like Map windows and Browser windows.

You can display rulers at the top and to the left to help you in positioning, sizing and aligning objects.

The Zoom displayed in the status bar indicates the magnification factor that is currently applied to the Layout. When the zoom is 37.46%, then the Layout is being displayed 37.46% of its actual size. When the zoom is at 123%, then the Layout is being displayed at 123% of its actual size.

Opening a Map in a Layout Window

To use a Layout window, on the **Window** menu, click **New Layout Window**.

Note: MapInfo Professional has some excellent tools to assist you in moving around the Layout window. See **Getting Around in the Map Window on page 185** for these details.

The *Help System* contains these related topics:

- *Sending Objects to the Back of a Layout*
- *Sending Objects to the Front of the Layout*
- *Printing a Layout*
- *Setting Printing Margins for a Layout*
- *How a Map Legend Displays in a Layout*
- *Printing a Legend in a Layout*
- *Changing a Map Scale in a Layout*
- *Moving a Map or a Layout*
- For instructions in sending objects to the back of a layout, see the *Displaying Data in the Layout* topic in the *Help System*.
-
- For instructions in sending objects to the front of a layout, see the *Displaying Data in the Layout* topic in the *Help System*.

Other Windows for Displaying Data

There are two other ways of displaying data that are used less often or can be used in conjunction with display options we have already reviewed.

- *Legend Windows* are the key boxes at the bottom of the map that explain what the map symbols mean. There are two different kinds of legend windows:

  a. The *Thematic Legend* window is automatically created and details the meaning of colors, symbols and styles on a thematic map. Display or hide this legend in the **Options** menu, by clicking the **Show/Hide Theme Legend Window** menu option.

  b. The *Cartographic Legend* displays legend frames for any map layer, not just thematic map layers. The legend window displays the legend, or key, to the cartographic data on your map.

  The legend frames can all be in one window, or can be split among several legend windows for the same map. Therefore, each map can have one or more cartographic legend windows containing the frames of your choice. Additionally, you can customize the text and style of the information presented. Modifications to the legend can be made through shortcut menus you access by right-clicking in the legend window or through the **Legend** menu. You can learn more about legends in **Working with Legends in Chapter 10 on page 369**.
- *Redistricting Windows* are allow you to create groupings of spatial information. This is a little more complex than these other options. For more information about redistricting windows, see **Redistricting** in the MapInfo Professional *Help System*.

Saving, Closing, and Exporting Your Work

Preserving your work is an important part of being productive. MapInfo Professional has a wide variety of ways you can save what you are working on, depending upon what needs to be saved and how you need to retrieve it.

Saving a Workspace

If you work with the same tables repeatedly, you know that opening each one individually every time you use it can be tedious. With MapInfo Professional's workspace feature, you can automate this process so you can get back to the business of creating maps and analyzing data sooner.

When you work with MapInfo Professional you generally use many different tables and windows. A Map window, for instance, is likely to be built of several layers. MapInfo Professional uses *workspaces* to save your work setup from session to session. Workspaces prevent you from having to reassemble all the pieces of your earlier setup from scratch. So, you don't have to reopen tables, re-create maps or layouts, resize windows, or do anything else just to duplicate what was on your desktop the last time you were using MapInfo Professional.

CAUTION: **Saving a workspace will not save edits you have made to tables in the workspace.**

If you close a window or table and you have thematic maps, graphs, label settings or label edits, or cosmetic objects pending, MapInfo Professional will prompt you to save the session to a workspace.

- For more information, see *Saving a Workspace and Saving a Map Window as a .TAB File* in the *Help System.*

For instructions on saving a Map window as a .TAB file, see the *Help System*.

Saving Your Workspace as an XML-Based MWS File

You can save the maps in your workspace out to an XML format for use with MapXtreme 2004 applications. When saving a workspace to MWS format, only the map windows and legends are saved. All other windows are discarded as MapXtreme 2004 applications cannot read that information. Once your workspace is saved in this format, it can be opened with the Workspace Manager utility that is included in the MapXtreme 2004 installation or with an application developed using MapXtreme 2004. The file is valid XML you can view it using any XML viewer or editor. MWS files created with MapInfo Professional 7.8 or later can be validated using schemas supplied with MapXtreme 2004.

Note: You will not be able to read files saved in MWS format in pre-8.0 versions of MapInfo Professional.

You can set the visibility of a modifier theme without regard to its reference feature layer, so you can turn the visibility of the main reference layer off but still display the theme. In MapXtreme2004, the modifier themes (Dot Density, Ranges, Individual Value) are only drawn if the reference feature layer is visible. To ensure that modifiers marked as visible in MapInfo Professional display in tools like Workspace Manager, we force the visibility of the reference feature layer so that its modifier themes display.

- For specific instructions, see *Saving your Workspace as an XML-Based MWS File* in the *Help System*.
- For more information, see *Caveats for Saving Label Expressions to MWS* and *Caveats for Saving Thematic Expressions to MWS* in the *Help System.*

Saving a Table or a Copy of a Table

To save changes to map objects or data, you must save the table. (On the **File** menu, click **Save Table**.) A dialog box displays asking you to choose which table you want to save.

You can also save a copy of the table under a new name, using **Save Copy As**. This, in essence, creates a new table. This is helpful in several instances, as when you want to:

- Retain any changes while preserving the original table.
- Save a table with a temporary column (from Update Column).
- Create a new table before you make editing changes to the original table.
- Save spreadsheet files that you wish to modify in MapInfo Professional.
- Save a table in a different projection.

To save a copy of the table:

1. On the **File** menu, click **Save Copy As**. The **Save Copy of Table** dialog box displays.
2. Choose the file to save and click **OK**.
3. Give the file a new name.

The original table remains unchanged and open for all further changes. The new table does not open immediately after its creation, but can be opened for use at any time. When choosing a name for your new table that begins with a number, MapInfo Professional adds an underscore to the beginning of the table name. For instance, your table 1STREETS.tab. will become 1STREETS.tab.

Saving a copy of a raster table only saves a copy of the *.tab file, not the image. You cannot change the projection of a raster or grid table using **Save Copy As**. To do this go to the **Table** menu, point to **Raster** and click **Modify Image Registration** and click the **Projection** button. Then save the file from there.

Since MapInfo Professional supports long filenames, it is easier to give the new table a name that is descriptive and at the same time distinguishes it from the original file.

The Help System contains these related topics:

- *Saving a Copy of your Table as a New Table*
- *Saving a Copy of Your Table as a New Table*
- *Tables you Cannot Update*
- *Choosing Ascending vs. Descending Sorts*
- *Column Name Syntax in the Order By Columns Field*
- *Rearranging a Table's Column Order*

Closing a Table

Closing a table removes it from active use in your current session. Choose the **Close** command from the **File** menu to close tables. When you close a table, you automatically close all views of that table. If you close a table that is displayed in a Map window with other tables, MapInfo Professional removes that table from the window, but the Map window remains open.

In addition, any subset tables of the original table (known as query tables) also close. You can use the Close command for any table, whether or not it is displayed in a window. Opening and closing *tables* is different from opening and closing *windows* in which you view your tables. You can open a table without opening any views of the data. Similarly, closing a window does not close the table (or tables) you are viewing in the window. They are still open and available for use. To close a window, click the **Ctrl**-menu box in the upper-left corner of any window and select **Close**.

If you have made changes to a table but have not yet saved those changes, MapInfo Professional will ask you if you want to save them before closing the table. To save your changes, choose **Save Table** from the **File** menu.

- For more information, see Closing a Table, Closing All Open Tables, and Closing Multiple Tables in the *Help System*.

Opening vs. Importing

You must open a table before you can use it. The Open command activates a dialog box for opening tables, (opening a table is described below). Choose the appropriate table by double-clicking on it in the dialog box.

Most programs require you to import files created in some other programs. MapInfo Professional allows you to work directly with files created in other programs. When you have a file in one of the following non-MapInfo Professional formats, you do not have to import it:

- dBase DBF
- Delimited ASCII
- Lotus 1-2-3
- Microsoft Access Database
- Microsoft Excel

By not importing data you save time; opening a file is quicker than importing it. You also save disk space. When you import a file, you make a copy of it. Since MapInfo Professional works directly with files from other programs, it does not have to make a copy.

When MapInfo Professional opens a file from some other program, it creates a file with a .TAB extension. This file describes the format of the file that actually contains the data. When you have opened a non-MapInfo Professional file, such as a Lotus file, in a previous session and attempt to open it again, the following prompt appears:

```
Table definition already exists. Overwrite it?
```

The table definition referred to is the .TAB file. It does not hurt anything if you continue. MapInfo Professional overwrites the .TAB file and opens the file.

Exporting Your Data to a New Format

You can export your Map window to other file formats with the Save Window As command (on the **File** menu, click **Save Window As**). This enables you to use your map in another application, such as word processing, presentation, or computer publishing packages.

Supported Export Formats

You can save data in a number of formats in MapInfo Professional. Windows .bmp is the initial default. The **Save Window to File** dialog box sets the last-used format as the default. Formats include:

- Windows Bitmap (*.BMP)
- Windows Metafile (*.WMF)
- Windows Enhanced Metafile (*.EMF)
- JPEG File Interchange Format (*.JPG)
- JPEG 2000 (*.JP2)
- Portable Network Graphics Format (*PNG)
- Tagged Image File Format (*TIF)
- TIFF CMYK (*.TIF)
- TIFF CCITT Group 4 (*.tif)
- TIFF LZW (*.tif)
- Graphic Interchange Format (*.gif)
- Photoshop 3.0 (*.PSD)
- Comma Delimited Format (.CSV)

- See *Understanding the Advanced Exporting Options* in the MapInfo Professional *Help System*.
- For more information, see *Understanding the Advanced Exporting Options* and *Setting your Output Setting Preferences* in the *Help System*

.Importing and Exporting Data in AutoCAD Format

Because CAD packages represent drawings in non-earth coordinates, all drawings imported or exported between MapInfo Professional and CAD suffer some distortion. This comes from trying to display non-earth information on a spherical coordinate system (like the globe).Coordinate conversions are used to assign longitude/latitude coordinates to CAD drawings that were created using non-earth coordinates. Conversions near the equator are more exact than conversions at the extremes of the hemispheres. To minimize distortion, import and export with no coordinate conversions and avoid translating maps that cover large areas.

- For more information, see *Importing DXF Attributes into MapInfo Professional* and *Importing Attributes with Nested Blocks* in the *Help System*.
- For more information, see *DXF Exporting Notes* in the *Help System*.

Cropping Images

When MapInfo Professional exports a window, it does not clip objects that extend beyond the edges of the windows, but it does export information about where the clipping is.

Other programs always honor the clipping of bitmap files. As for other formats, the behavior varies depending on the program that is used to display and print the file. Many programs, such as drawing programs, "explode" the file into individual objects. A file containing several country boundaries would explode into several polygon objects, one for each country. Programs like these usually ignore the clipping information that MapInfo Professional stores in the file.

Other programs, such as word processing programs and spreadsheets, typically open files as one compound object, without trying to explode them into component objects. These programs usually honor the clipping information and clip the contents appropriately.

For example, if you are exporting a Map window that displays part of Germany, but not all of it, the exported file contains the entire image of Germany. It also contains information about where MapInfo Professional clipped that image in its Map window. But when you open the exported window in your target application, a drawing package for example, the image of Germany may not be clipped.

Exporting to ASCII Format

MapInfo Professional also allows you to export your tabular data to a delimited ASCII file. This file can later be edited with a text editor or imported into another package. When you export to ASCII, MapInfo Professional displays the **Delimited ASCII Information** dialog box, where you choose your delimiter character. You can also choose to have the first row of the ASCII file become column titles.

MapInfo Professional also displays a dialog box that you use to indicate the character set for the exported ASCII file. Different platforms use different character sets. MapInfo Professional must know the platform where you are going to use the exported file in order to provide the appropriate character set. No graphical data is exported to ASCII.

Exporting to dBase (*.DBF) Format

MapInfo Professional can export tabular data into dBASE DBF format. Exporting to DBF creates only the .DBF file. No graphical data is exported to dBASE. When you save your table in DBF format, you create a .DBF file, as well as some other files. These other files contain graphic information (for example, MapInfo Professional indices and other information that MapInfo Professional uses).

MapInfo Professional also displays the dBASE DBF Information dialog box that you use to indicate the character set for the exported DBF file. Different platforms use different character sets. MapInfo Professional must know the platform where you are going to use the exported file in order to provide the appropriate character set.

Smoothing Map Images During Export

You can anti-alias a table during the export process to give you more control over your map images. This is particularly important when you are saving maps created in MapInfo Professional for use in other Windows-based applications, in particular in slide presentations or for web pages.

Anti-aliasing allows you to smooth images in all types of windows such as Map windows, layouts, legends, and graphs.

Note: You cannot anti-alias images you are exporting to .EMF or .WMF format, because these are not true raster formats.

There are three smoothing options you can use to customize your raster image:

1. *Smooth using a Filter value*. You can set a flag that selects one of six filters that allow you to choose the direction the filter is applied to the image from.
2. *Smooth using a Mask value*. You can select a value that indicates the size of the area you want to smooth. For example, to create a 3x3 pixel mask value, you would enter a 3 in this field. This would limit the amount of change in the color of the pixels. Typically mask sizes would be 2-3 pixels when exporting at screen resolution. If you are exporting at a higher resolution, a larger mask might be appropriate.
3. *Smooth using a Threshold value*. You can select a threshold value to indicate which pixels to smooth. Each pixel in an image has a value based on its color. The smaller the pixel value, the darker the color. Select this option to smooth all of the pixels above the threshold you enter in this field. When you set this value to 0, MapInfo Professional will smooth all of the pixels.

You must either set a global preference for these anti-aliasing options or set them locally during the export process (using the Advanced button).

- For specific instructions, see *Smoothing Map Images During Export* in the *Help System*.

Using the Tools in the Tool Manager

MapInfo Professional contains many additional tools that simplify mapping tasks, convert MapInfo Professional files to different file formats and vice versa, automate tasks for working with DBMS tables, and more. The Tool Manager helps you run and manage these many utilities easily.

Use the Tool Manger to run, add, edit, or remove tools from the currently registered list of tools in the Tools menu. You can also configure a tool to run automatically upon startup. If you performed a Custom installation, you may have elected to not install the tools. In this case when you open the **Tool Manager** dialog box, the list box will be empty (on the **Tools** menu, click **Tool Manager**).

For information about using the tools in MapInfo Professional, see the MapInfo Professional *Help System*.

What are the MapInfo Professional Tools?

These tools are covered in more depth in the *Help System*.

AutoLabeler – Use this tool to place text object style labels in the Cosmetic Layer of the active Map window.

CoordSys Bounds Manager – Use this tool to check and set the coordinate system bounds for mappable MapInfo Professional base tables.

Concentric Ring Buffer – Creates concentric ring buffers around one or more map objects. This tool also computes aggregated values for underlying data that occur within each ring. Therefore, it can be used to count how many customers occur within each ring and their total sales. You can graph the results. See *Concentric Ring Buffer Tool* in the Tools section of the *Help System*.

Coordinate Extractor – Allows you to add two columns to an open table and updates each column with x and y coordinates in the table's native projection. For objects other that points, the x and y coordinates will represent CentroidX and CentroidY locations. See *Coordinate Extractor Tool* in the Tools section of the *Help System*.

Create Line by Length (Cogoline) – Draws lines in the Cosmetic Layer of a specific length and angle. You can also use DMS coordinates and create polylines with this tool. See *Create Line by Length (COGOLine) Tool* in the Tools section of the *Help System*.

DBMS Catalog – Use this tool to create a MapInfo Professional MapCatalog table in a remote database. You need the catalog to download coordinate information to MapInfo Professional from a remote database. This tool should be used by a qualified DBA.

DBMS Count Rows in Table – Allows you to optimize opening large tables (million or more rows) using the DBMS Live Access method (unlinked tables). This will update an entry for a table in the MapCatalog, correctly setting the number of rows for that table.

Degree Converter – Converts a column of data containing DMS coordinates to Decimal Decimals and Decimal Degrees to degrees/minutes/seconds. See *Degree Converter Tool* in the Tools section of the *Help System*.

Delete Duplicates – Use this tool to delete duplicate records from a table while retaining map objects. This tool does not change the original table in any way. See *Delete Duplicates Tool* in the Tools section of the *Help System*.

Disperse Points – Disperses points located in the same position. Points can be dispersed systematically or can be used to calculate the distance from a selected object (or group of objects) to the closest or farthest object(s). You can also specify criteria to limit the results. See *Disperse Points Tool* in the Tools section of the *Help System*.

Distance Calculator – The Distance Calculator tool (DistanceCalc.MBX) is used to calculate the distance from a selected object (or group of objects) to the closest or farthest object(s). You can also specify criteria to limit the results. See *Distance Calculator Tool* in the Tools section of the *Help System*.

EasyLoader – EasyLoader is a Windows-only utility that is loaded using the Tool Manager. EasyLoader allows you to upload MapInfo Professional tab files to a remote database. Online help is available for using EasyLoader. See *EasyLoader Tool* in the Tools section of the *Help System*.

GeoTracker Tool – This is a GPS tool to be used with MapInfo Professional, which supports up to 12 com ports, sophisticated error message management for Disconnect and Reconnect features, and superior installation and help support features. See *GeoTracker Tool* in the Tools section of the *Help System*.

Grid Maker – Draws a Graticule: a grid of latitude/longitude lines. See the *Grid Maker Tool* in the Tools section of the *Help System*.

Grid Tools – Use these tools to create a MapInfo Professional native grid file from a table of points, convert grids from any format that MapInfo Professional can read into MapInfo Professional grid format (.MIG), and display x, y, and z coordinates, and row and column, of the grid you selected.

HTML Image Map – HTML Image Map allows you to create a web page based on any MapInfo Professional Map window that includes a layer of polygons. The resulting HTML page includes an Image Map (JPG or PNG) and applies a user designated title and copyright. See the *HTML Image Map Tool* in the Tools section of the *Help System*.

Labeler – Transfer layer's labels into permanent text objects; label current selection; make individual labels created with the Label tool into permanent text objects. See the *Labeler Tool* in the Tools section of the *Help System*.

Legend Manager – Takes control of how MapInfo Professional displays Legend windows. Includes the ability to have multiple Legend windows open, and to associate each legend with a specific Map window. See the *Legend Manager Tool* in the Tools section of the *Help System*.

Link Utility for Google Earth – Use this tool to display your map data on Google Earth Maps. See the *Link Utility for Google Earth™* in the Tools section of the *Help System*.

Mapping Wizard Tool – Use this tool to open data, maps, perform analysis, and generate output using a wizard. This tool is set to load automatically when you start MapInfo Professional.

MapX Geoset Tool – Allows you to read a MapX Geoset into a MapInfo Professional Map window, and write a MapX Geoset from the contents of the MapInfo Professional Map window. See the *MapX Geoset Utility* in the Tools section of the *Help System*.

Named Views – Use this tool to save a Map window's current zoom and center as a named view. Return to that view by selecting the view name from a dialog box.

North Arrow – Add North Arrows of various styles and optionally add a Magnetic Declination arrow. A North Arrow can be added to a Map or Layout. You can either specify from the dialog box which corner to position the North Arrow, or use the toolbar button to drag a rectangle and place the North Arrow at the specified location. See the *North Arrow Tool* in the Tools section of the *Help System*.

Overview – Use this tool to open a new Map window to provide an overview of another Map window.

Register Vector – Use this tool to put control points into a vector image and reference points into a Map window and then performs an affine transformation to line them up.

Rotate Labels – Use this tool to rotate all the labels in a map layer at once.

Rotate Map Window – Use this tool to rotate the contents of the current Map window a specific number of degrees. It calculates and sets an Affine transformation for the Map window.

Rotate Symbols – Use this tool to rotate all the symbols in a map layer at once.

ScaleBar – Use this tool to create a custom distance scalebar to annotate a Map window. This tool can also be used in Layout windows.

Seamless Table Manager – Use this tool to create and manage seamless map sheets.

Search and Replace – Search a character column for a specific string and replace it with another string or to search and replace multiple column entries. See the *Search and Replace Tool* in the Tools section of the *Help System*.

Send to MapX Mobile – Use this tool to write a custom MapX geoset and associated .TAB files to create a user-defined subset of a map window's background data for display on a mobile device.

Set the Minimum Bounding Rectangle – Use this tool to set the Minimum Bounding Rectangle for ODBC live access based tables. See the *Set the Minimum Bounding Rectangle Tool* in the Tools section of the *Help System*.

Shields – Use this tool to draw decorative frames around text objects.

Spatialize SQLServer Table – Use this tool to accommodate spatial data in an existing SQL table.

SpiderGraph – This tool draws lines between objects in a single table, or the objects from two tables based on a join. It then creates a new table of lines that connect the objects from the original table(s) based on matching column names. See the *Spider Graph Tool* in the Tools section of the *Help System*.

Symbol Maker – Use this tool to create, edit, and delete MapInfo Professional symbols. These symbols become part of the standard MapInfo Professional symbol set.

Synchronize Windows – This tool provides toolbar icons that allow you to automatically share changes made in one mapper window to all other mapper windows in a given MapInfo Professional session. See the *Synchronize Windows Tool* in the Tools section of the *Help System*.

Table Manager – Use this tool to get information about all currently open tables, including table metadata.

TOC Tool – Builds a seamless table of all the files listed in a TOC file. This utility will create one or more seamless tables, grouped by zone and resolution. See the *TOC Tool* in the Tools section of the *Help System*.

Universal Translator – Import and export MapInfo Professional data to and from other popular mapping file formats. Provides a log file viewer to confirm log file changes. See the *Universal Translator Utility* in the Tools section of the *Help System*.

Window Manager – Use this tool to assign the title of Map, Browser, Graph, Layout, and Redistricter window and the default table view. The Set Default View option allows you to select a layer from an open Map window and make the default zoom and center settings for the layer's base table match those of the Map window. The default center and zoom settings are written to the table's .MAP file. See the *Window Manager Tool* in the Tools section of the *Help System*.

Workspace Packager – Use this tool to create a copy of a workspace in a new location or folder, and copies all the data referenced by the workspace to the same location. MapInfo Professional updates the internal references in the workspace and .TAB files to point only to the "packaged" copies of the data, so you can open the new workspace no matter where the folder is moved or copied, even if the folder is moved or copied to a different computer. See the *Workspace Packager* in the Tools section of the *Help System*.

Workspace Resolver – Use this tool to find missing .TAB files while you are opening a workspace. See the *Workspace Resolver* in the Tools section of the *Help System*.

- Instructions for adding a tool to the Tool Manager, editing, and removing a tool from the Tool Manager are available in the *Help System*.

5

Putting Your Data on the Map

As we saw in **Chapter 4: Data – Where MapInfo Professional Begins**, you can convert your existing data to a format that MapInfo Professional can use to display it on a map. Now you're getting somewhere! But how does MapInfo Professional know where to put the information on a map? That is the subject of this section of the *User Guide*.

Sections in this Chapter:

- **How Do I Get My Data on the Map? 200**
- **Displaying your Data on a Map 200**
- **Geocoding – Assigning Coordinates to Records 211**
- **Putting Latitude/Longitude Coordinates on a Map 223**
- **Displaying Your Data on the Map 225**
- **Printing Your Results 226**

How Do I Get My Data on the Map?

There are three steps to putting your organization's data on a map:

- Creating a MapInfo .tab file of your data
- Geocoding or creating points for the data
- Displaying your points on a map

When Do I Geocode vs. Create Points?

There are two processes that MapInfo Professional uses to identify and plot your data on a map.

During *Geocoding*, MapInfo Professional reads data such as street data, postal code data, and other non-coordinate information from your database and matches it against street or postal code information on a MapInfo data table.

During the *Create Points* process, MapInfo Professional reads X and Y coordinate data (such as longitude and latitude data from a Global Positioning System) and plots data using those coordinates. Use the appropriate process to the type of data you have collected.

- For more about the geocoding process, see **Geocoding – Assigning Coordinates to Records on page 211**
- For more about the create points process, see **Putting Latitude/Longitude Coordinates on a Map on page 223**.

Note: If your data is in non-MapInfo format before you geocode or create points, you must convert it before using either of these processes.

- For more specific instructions on creating points, see *Putting Longitude/Latitude Coordinates on a Map* in the *Help System*.

Displaying your Data on a Map

The first step in using your data in MapInfo Professional is to create that .tab file from your data. This process takes the data you have created (either a spreadsheet or database) and extracts the information into a .tab file that MapInfo Professional can use. Your data remains in tact as we go through this process. The process that MapInfo Professional uses depends upon the type of format your data is in. You can create a MapInfo table of the following data file format types:

- Microsoft Excel (.XLS)
- Microsoft Access (.MDB)
- d-Base (.DBF)
- Lotus 123 (.WKS, WK1)
- ASCII (.TXT)

- Comma Delimited files (.CSV)
- RDBMS (Oracle, Informix, SQL Server)
- XML (Web Map Service)

Note: The process for creating a .tab file from ASCII data is called “registering” instead of creating because we are actually making a series of pointers to the ASCII data. The process is different but your resulting files behave the same way.

The *Help System* contains these related topics:

- *Displaying your Excel (.XLS) Data*
- *Displaying your Access (.MDB) Data*
- *Displaying your Comma Delimited Data*
- *Displaying your dBase Data*
- *Displaying your Lotus 1-2-3 Data*
- *Displaying your ESRI Shapefile Data*
- *Displaying and Registering Your ASCII Data*
- *Importing and Displaying GML File Data*
- *Displaying Your Remote DBMS Data*
- *Displaying and Importing Data from a Web Map Service*

Displaying your Excel (.XLS) Data

You can create a .tab file from an Excel file that is up to 64K in size.

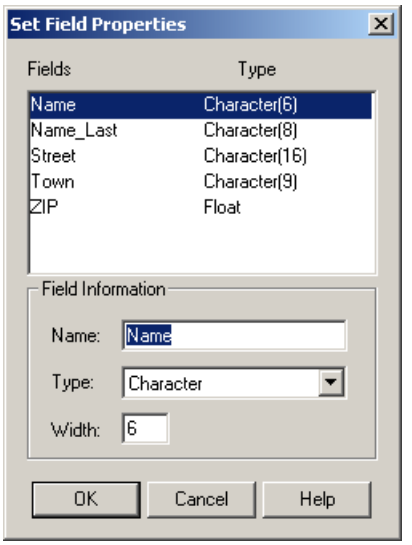
To create a .tab file from your Excel (.XLS) data:

1. In MapInfo Professional on the **File** menu, click **Open** to display the **Open** dialog box.
2. In the **Files of Type** list select (.XLS), navigate to your data, and click **Open**.
3. Select the worksheet you want in your MapInfo data table. Make sure that this data includes either postal codes or longitude/latitude coordinate values.

   The default data range for an Excel file is the entire worksheet.

   - If you select the **Use Row Above Selected Range for Column Titles** check box, the default data range begins at A2 (row 2).
   - If you clear the **Use Row Above Selected Range for Column Titles** check box, both the **Named Range** and **Current Value** fields revert to their previous values on the Entire Worksheet.
4. Click **OK** to display the **Set Field Properties** dialog box.

   This dialog box allows you to reset the name, type and properties of any field (column) that you import from the Excel table. The top of the **Set Field Properties** window shows the Fields (column names) and Type (character, date, etc.) from the Excel spreadsheet. When you select one of these fields, the **Field Information** box entries at the bottom allow you to specify the field name, data type, number of characters (for character and decimal fields) or number of decimals (for decimal fields only).



Note: If you click **Cancel**, MapInfo Professional cancels the import operation.

5. Click **OK** to convert the data to a MapInfo table (.tab) format. Now that you have converted your data, you can plot your data; see the next section to continue.

- For more information, see *Default Range Options When Importing MS Excel Files* and *Controlling Treatment of Imported Excel Tables* in the *Help System*.
- For more specific instructions on creating points, see *Putting Longitude/Latitude Coordinates on a Map* in the *Help System*.

Displaying your Access (.MDB) Data

To convert your Microsoft Access (.MDB) data into a MapInfo Professional table:

1. Choose **File > Open**. The **Open** dialog box displays.
2. Choose **Microsoft Access Database** from the **Files of type** menu. The Access databases (.mdb) for the specified location display.
3. Choose an Access database to open. If security is turned on, you will be prompted to give user and password information to open the database.
4. The **Open Access Table** dialog box displays the tables for the opened database.
5. Choose an Access table or tables to open. The table or tables are opened in MapInfo Professional. (Please note that for a table name with a space such as Order Details can be saved in MapInfo Professional but subsequently will not be visible to MapInfo Professional.)

After you open an Access table in MapInfo Professional for the first time, MapInfo Professional creates a definition for the table and gives it a .TAB extension. This enables you to it treat it like any other MapInfo Professional table. For example, to open this file you would now open it like any other MapInfo Professional table.

Note: Even though the table has the .TAB extension in MapInfo Professional, your data is still in your original Access database table and is not a duplicate.

The *Help System* contains these related topics:

- *Microsoft Access Table Specifications*
- *Creating an Access Table in MapInfo Professional*
- *Saving a MapInfo Professional Table as an Access Table*
- *Saving an Access Table as Another Access Table*
- *Limitations of Working Directly with Access Tables*
- IFor more specific instructions on creating points, see *Putting Longitude/Latitude Coordinates on a Map* in the *Help System*.

Displaying your Comma Delimited Data

You can create native .tab files for comma delimited data in MapInfo Professional.

Opening Comma Delimited Files in MapInfo Professional

You can export tables to comma delimited .csv text files. You can open .csv files from our **File > Open** dialog box as well.

To open a comma delimited file:

1. From the **File** menu, click **Open** to display the **Open** dialog box.
2. From the **Files of type** dialog box, select **Comma delimited CSV (.csv)**.
3. Navigate to the folder that contains the file you want to open and click it to select it.
4. Click **Open** to display the **Comma Delimited CSV Information** dialog box.

   The **Delimiter** option buttons in this dialog box are disabled intentionally because commas are the only expected delimiters in this file format.
5. Select the **File Character Set** for this file from the drop-down list and select the **Use First Line for Column Titles** check box if applicable.
6. Click **OK** to open the file.

Exporting to a Comma Delimited CSV Format

When you export a file to a comma delimited (CSV) format, a Comma Delimited CSV Information dialog box displays. In this dialog box, you can select a new delimiter, choose the file character set, and choose to use the first column in the file for column headings. When you have made your selections, click **OK**.

- For more specific instructions on creating points, see *Putting Longitude/Latitude Coordinates on a Map* in the *Help System*.

Displaying your dBase Data

When you convert your data to a MapInfo Professional table, you do not in any way change the original data. MapInfo Professional simply creates a conversion table (.tab) of your data.

To open your dBase (.DBF) data into a MapInfo Professional table:

1. On the **File** menu, click **Open** to display the **Open** dialog box.
2. In the **Files of Type** list, select the format (**.DBF**), navigate to your data, and click **Open**.
3. Select the appropriate character set for your MapInfo data table. Windows U.S. and Western Europe ("ANSI") is the default option.
4. Click **OK** to convert your selected data to a MapInfo table (.tab) format.
5. On the **File** menu, click **Save Copy As** to make an editable copy of your table. Then, on the **File** menu, click **Close Table** and close the original table. Finally open the editable copy.

- For more information, see *Saving Data in DBF File Format* in the *Help System*.

Displaying your Lotus 1-2-3 Data

To open your Lotus (.WKS, WK1) data into a MapInfo Professional:

1. On the **File** menu, click **Open** to display the **Open** dialog box.
2. In the **Files of Type** list, select the format (**.WK1,.WKS**), navigate to your data, and click **Open**.
3. Choose the worksheet you want to convert to a MapInfo data table.

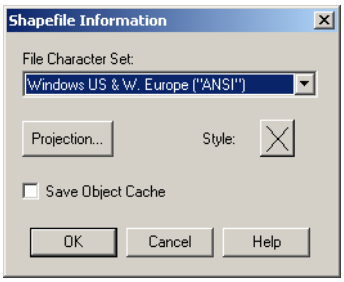
   Note: If there are column headings above each column in this worksheet, select the **Use Row Above Selected Range for Column Titles** check box. Then, select **Other** from the drop-down box and specify the cell range of the data you want to include in the MapInfo Professional table.
4. Click **OK** to convert your data to MapInfo Professional table format.

Displaying your ESRI Shapefile Data

One of the prominent graphical formats in our industry is the ESRI shapefile.

To open a shapefile in MapInfo Professional:

1. On the **File** menu, click **Open** to display the **Open** dialog box.
2. Select **ESRI shapefile** in the **Files of type** drop-down list.
3. Navigate to the file's directory and click it to open it.
4. Click **Open** to display the **Please specify a TAB filename** file. This dialog box saves the shapefile into a format that MapInfo Professional can read. The file has the same name as the file you selected but has a .tab extension.
5. Click **Save** to display the **Shapefile Information** dialog box.



6. Complete the entries in this dialog box and click **OK** to display the shapefile.

   File Character Set

   Select the character set appropriate for this file. The default option is **Windows U.S. & Western Europe (ANSI)**, but make your selection based on your local settings.

   Projection

   Select the appropriate projection for this file by clicking this button, selecting the category and projection and clicking **OK**.

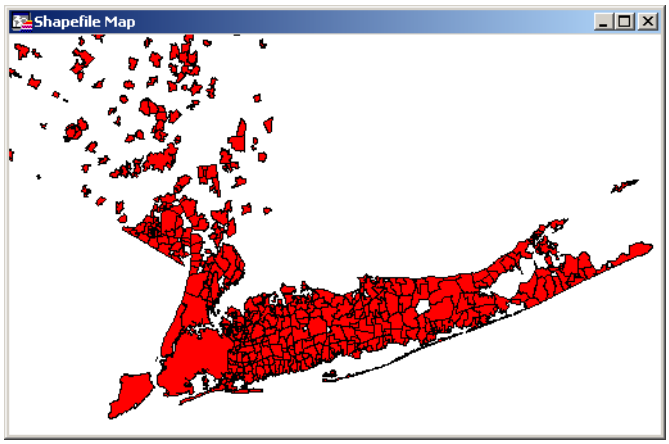
   Style

   Select any line or region style overrides that are necessary for this image by clicking the **Style** button. When you select this option, the appropriate style options dialog box displays. Make your changes and click **OK** to save them.

   Save Object Cache

   Select this check box to save the *.MAP file to hard drive. If you choose not to save the object cache, you will have to recreate the *.MAP file the next time you open the shapefile file. However, if you are going to save the shapefile as a *.tab file, you do not have to select the check box.

   Note: If after you open the shapefile in MapInfo Professional, you edit the file in ESRI ArcView and save the file, the contents of the *.MAP and *.DAT files are recreated to retain these edits even if you selected **Save Object Cache** before.



- For more information, see *Working with Shapefules Containing M and Z Values* in the *Help System*.

Registering and Displaying your ASCII Data

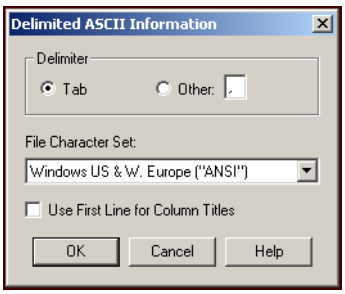
When you are working with ASCII data in MapInfo Professional, you don't actually create the table as you would in the other file formats we have discussed. MapInfo Professional registers your ASCII table by creating a MapInfo (.tab) file that points to the fields in the original file.

Note: Registering your data using MapInfo does not change the original data in any way.

If your delimited ASCII file has an extension other than .TXT (such as .ASC, .CSV, or .DAT, etc.), rename a copy of the file to <FILENAME>.TXT before you begin.

To register your ASCII (.TXT) data:

1. Open the data file using Wordpad/Notepad (on the **Start** menu, point to **Programs** and click **Accessories**) or another text editor. See whether you have column headings and what delimiter (character that separates each piece of data from the next) is used in the data file.
2. In MapInfo Professional, open **File** menu and click **Open** to display the **Open** dialog box.
3. In the **Files of Type** list, select the format (**.TXT**), navigate to your data, and click **Open**.



4. Specify a tab delimiter or type the other delimiter in the field provided.
5. Choose the character set your file is using from the **File Character Set** drop-down list.

   Select the **Use First Line for Column Titles** check box if you have column headings.
6. Click **OK** to register your data in MapInfo Professional.
7. On the **File** menu, click **Save Copy As** to make an editable copy of your table. Then, on the **File** menu, click **Close Table** and close the original table. Finally open the editable copy. You can only read information from these files.

- For more information, see *Working With Spreadsheets and Editing Excel and Lotus Spreadsheets* in the *Help System*.

Opening MapInfo Professional Grid Files

To open MapInfo Professional Grid Files:

1. Choose **File > Open** to display the **Open Table** dialog box.
2. Choose **Grid Image** (*.grd, *.mig), from the **Files of Type** list box.

3. Click the file you want to open and click the **Open** button.

   Note: There are some grid files in the introductory data provided on the MapInfo Professional data CD.

Importing Graphic Files

To import a graphic file:

1. Choose **Table > Import** to display the **Import File** dialog box. Specify the location, name, and format of the file you want to import.
2. Click Import to display the **Import into Table** dialog box.
3. Specify the name and new table format for the table you are creating.
4. Click **Save**. The file is imported into the file you named with the specified format.

Importing and Displaying GML File Data

You can import **OSGB MasterMap GML Files** into MapInfo Professional. Each layer in the GML file is imported into a separate .TAB file. We provide support for some of the Topography features (OSGB version 2.0), Topographic Area, Lines and Points, Cartographic Symbols and Boundary Lines. Currently, we maintain support for these features and add support for Cartographic Text and Departed Features.

Currently, we support the OSGB recommended styles by mapping the style definitions to existing MapInfo Professional styles. Where it is not possible to render complicated fill patterns, we use the simple dot screen that the OSGB recommended to us. You cannot change the OSGB style mapping to MapInfo styles.

- For more information, see *Importing and Displaying GML File Data* in the Help System.

Importing and Displaying GML 2.1 Files

You can import GML 2.1 files into MapInfo Professional directly. To import successfully, the XML must contain a reference to a valid schema that MapInfo Professional can read. For example, the schema location could be a path relative to the XML file:

```
xsi:schemaLocation="http://www.mapinfo.com/wfs_XX .\mi_usa.xsd"
```

Or, it could be a URI:

```
xsi:schemaLocation="http://www.lm.se/xml/namespace/abc
http://www2.xxx.se/xml/scheman/abc.xsd"
```

- For more specific instructions, see *Importing and Displaying GML 2.1 Files* in the *Help System*.

Understanding MapInfo Professional's Use of the Topography Layer

OSGB MasterMap's Topographic Layer contains nine themes including roads, tracks and paths, buildings, landforms, water, height, heritage, structures, and administrative boundaries. You can import these themes as TopographicArea, LandformArea, TopographicLine, TopograpicPoint, CartographicText, CartographicSymbols, BoundaryLines, and DepartedFeatures. The TopographicArea feature type contains two 'complexes', Topography and Landform, which contain different polygons of information. The Landform polygons overlap the Topography polygons (which represent land features like slopes and cliffs).

We split the TopographicArea feature type output into two layers so it is possible to save them in different tables. The TopographicArea table contains only output whose areas defined in the OSGB user guide as being part of the Topography complex or *Structuring Layer*. There is a feature type in the **GML Import** dialog box called LandformArea, which allows the creation of the LandformArea table. See **Importing and Displaying GML File Data on page 207** for a clearer picture of this process in action.

Viewing a List of Open Tables

You can view a list of open tables but you cannot add or remove tables from this list in any way. This list is view-only.

Note: Hover over an entry in the Tables List to display the path of the open table.

To view a list of open tables:

1. From the **Table** menu, choose **List Open Tables** to display the **Table List** dialog box.
2. Select the **Group by Type** check box to display the tables by format type. Click **OK** to close the dialog box.

You can expand or contract the groups using the + and - to see the file names of the open tables.

Displaying Data Details using the Statistics Window

The Statistics window displays the details of a selected data record. This information must exist in the .TAB file's metadata to display in the Statistics window. As the selection changes, the data is re-tallied, and the statistics window is updated automatically.

To see the details of a data record:

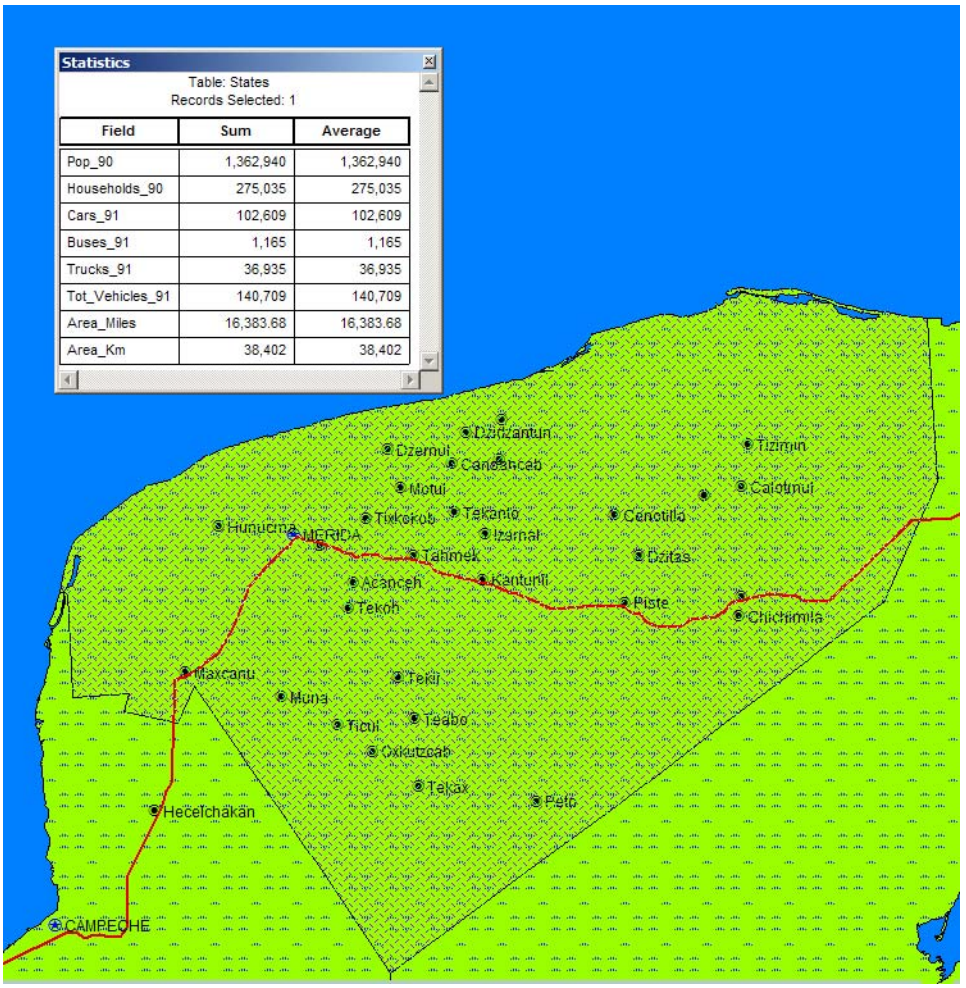
1. Open a .TAB file with statistical data in it.
2. Select a geographical object in the Map window.
3. Do one of the following:
   - Select **Options > Show Statistics Window**
   - Click

   To copy the contents of the **Statistics** window to the clipboard, press and hold the **Ctrl** key and press **C**. Go to the application you want to paste the Statistics data to and do one of the following:
   - Right-click to display the shortcut men, click **Paste**.
   - Hold down the **Ctrl** key and press **Insert**.

You cannot select particular contents of the Statistics window.

Note: When you want statistics for an entire table, use **Query > Select All** to select all records in a table.

Figure: Statistics Window



Displaying Your Remote DBMS Data

The process for displaying spatialized data from Oracle, Informix, or SQL Server is different from the tables we have discussed so far. For more information about accessing remote data, see **Understanding Remote Tables and Databases on page 248**.

Displaying and Importing Data from a Web Map Service

A Web Map Service (WMS) is a technology that gives you a source for data over your Intranet or over the Internet. This innovation is based on a specification from the Open GIS Consortium (OGC) and allows you to use raster map images from servers that also comply with the specification. You must specify the coordinate system within your data request to ensure that the images you retrieve "sync up" or register with your other map data.

This specification supports transparent pixel definition for image formats as well. This allows you to use the images you retrieve as overlays and not solely as the bottom layer of your map.

WMS data may not exist for the geography you are looking for. Further, the data that is provided is determined by the WMS server.

Note: You must have a working Internet connection to retrieve or use WMS data.

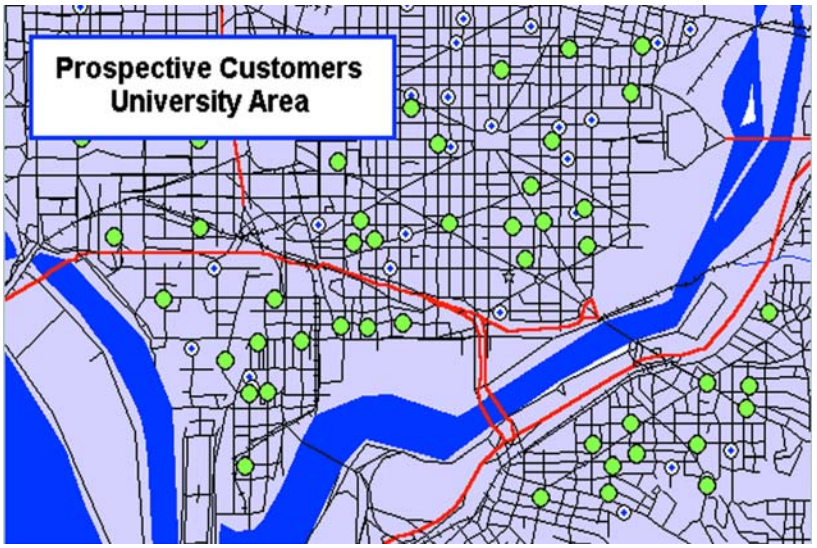
- For instructions on retrieving and displaying data from a Web Map Service, see *Retrieving Map Data from Web Map Services* in the *Help System*.

Geocoding – Assigning Coordinates to Records

To display your data on a map, you must first assign X and Y coordinates to each record. One way that MapInfo Professional assigns these coordinates is by matching geographic information in your database table to geographic information in another table (referred to as a *search table*) that already has X and Y coordinates associated with it.

For example, you want to assign X and Y coordinates to a customer record whose address is 127 Winston Ave. MapInfo Professional reads that address and looks for a matching address in the search table, such as a StreetPro table. (This search table already has X and Y coordinates associated with its records.)

When MapInfo Professional matches 127 Winston Ave in your table to 127 Winston Ave in the search table, it assigns the corresponding X and Y coordinates to your record. The geocoded point becomes part of your database. You can then view these points by displaying your table in a Map window.



What Do I Need to Know Before Geocoding?

It is important to know your data and what you want to use it for before you select a method of geocoding. Ask yourself these questions:

What kind of geographic information do I have in my database?

Do you have street addresses, towns, cities, postal codes, states, countries? Do you have potentially ambiguous information? For example, if you have a database of customer street addresses, will you have 125 Main Street in Smithtown and a 125 Main Street in Nassau? If so, you may have to refine your search using town boundaries or postal codes.

What kind of maps do I have to work with?

You will need computerized maps that are at the level of detail that match your data. For example, if you want to geocode a database of customers in specific counties by street address, you will need maps of the desired counties that go to street level. A map of the United States that only goes to a county level would not work for you. You can purchase the appropriate maps for your geocoding application from MapInfo Professional or your reseller.

How geographically accurate does the placement of my data have to be?

Taking into account the first two questions, you must decide how accurate the geocoding must be. If you are trying to pinpoint the locations of cable wires, crime scenes, or fire hydrants, a high degree of accuracy is needed. In this case, you should geocode your data to street level.

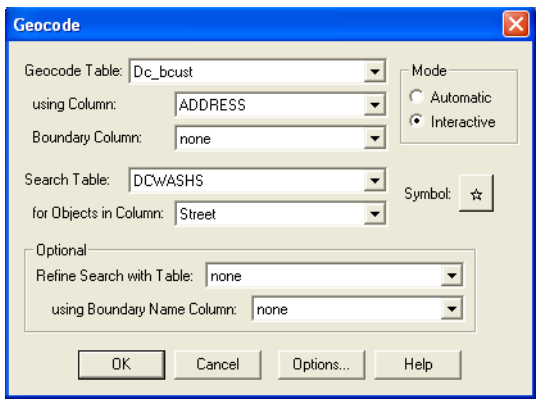
If, however, you are going to use your data to thematically shade postal code boundaries, town boundaries, county boundaries, state boundaries, or country boundaries, you may not need a high degree of accuracy.

In this case, geocoding against boundary files such as USZIPBDY.tab, which we provide, would be sufficient for your needs. Since this file does not include point postal codes (postal codes assigned to a single building or company), the hit rate may not be as good as when you geocode by street.

Understanding the Geocoding Process

To assign X and Y coordinates to the records in your table, choose Geocode from the Table menu. MapInfo Professional displays the **Geocode** dialog box, where you enter the following information:

- The name of your table for which you want to assign X and Y coordinates.
- The column in *your table* that contains the geographic information that will be used for matching.
- The name of the *search table* containing the geographic information that will be used for matching.
- The search table column containing the geographic information for matching:



The dialog box also offers you the option of geocoding your data in two modes: *automatically* or *interactively*. When you geocode a table automatically, MapInfo Professional geocodes exact matches only and ignores all other records. It is the faster method, since MapInfo Professional requires no user interaction once the geocoding process begins. When you geocode a table interactively, MapInfo Professional pauses when it fails to match a record and lets you select from a list of close matches. For more about the automatic and interactive geocoding modes, see **Modes of Geocoding on page 214**.

Note: We recommend that you geocode your table automatically first and then go back and geocode interactively to match the remaining records.

Not Getting Geocoding? Try this Example...

The objective of geocoding is to place data from your database accurately on a map. Let us call your data the *source* table. You can think of the geographical coordinates on a map as a *target* table.

To geocode a record:

- MapInfo has to match an address in the source table with a location on the target table

Most of the problems in geocoding occur in trying to take the address data in the source file and match it to addresses in the target tables.

Modes of Geocoding

MapInfo has two geocoding modes: automatic and interactive. The process MapInfo uses to match target addresses with source addresses is the same in both modes.

Automatic mode matches addresses based on the choices in the **Geocode** dialog box.

When Geocoding is in automatic mode, only exact matches are geocoded. When some of your data fails to match exactly (due, perhaps, to typographical errors), you need to geocode in Interactive mode to match the near misses by hand. It is generally best to do two passes through your table, with the first pass set on Automatic and the second pass set on Interactive. This approach takes less processing time.

- For instructions on geocoding in automatic mode, see *Geocoding Automatically* in the *Help System*.

Interactive mode stops at each address that does not meet the geocode parameters and permits you to assist in the matching process. When you geocode interactively, you are not changing the data. You are merely redirecting MapInfo Professional to look for different information.

- For more information, see *Geocoding Interactively* in the *Help System*.

In most cases, the best geocoding strategy is to geocode in automatic mode and then geocode in interactive mode to deal with the records MapInfo was unable to handle automatically.

Manual mode. Automatic and interactive geocoding work well for databases with “clean” data. Sometimes, however, you know where a point should be on the map, but the location data does not allow for a match. Manual geocoding is the process of placing your data records on the map by clicking its location on the map. This method works best when you have a small table which contains data that you are very familiar with.

- For more information, see *Geocoding Manually* in the *Help System*.

Methods of Geocoding

In addition to geocoding automatically and manually, you have choices in how precise you want the geocoded record to be. Let’s look at the variety of ways you can geocode your table.

Geocoding by Address

Street addresses typically consist of two or three components:

- Street number
- Street name
- Apartment, Suite, Floor, Room number or some other piece of information. Many addresses do not have this component

MapInfo has one procedure for dealing with the street number and another procedure for dealing with the street name. MapInfo deals with the third component, if present, as though it were a part of the street name.

When you geocode your table with street addresses, MapInfo Professional matches the addresses in your table to the street names and address ranges in a street table, such as StreetPro (MapInfo’s premier streets data product) and assigns X and Y coordinates to your records. When you display

your records, MapInfo Professional will spot the record at the location of the record's address. MapInfo Professional places the record on the proper side of the street, offsets it from the side of the street to the specified distance, and insets it from the end of the street the specified percentage of the line. The **Options** dialog box controls these parameters. For more about setting the street offset in the **Options** dialog box, see *Street Offset* in the *Help System*.

Geocoding by Boundary

In computer mapping, the term boundary is used to designate enclosed regions or areas such as countries, cities, and postal codes. When you geocode your table with boundaries, MapInfo Professional matches the boundary name in your table with the boundary name in the search table. MapInfo Professional assigns the boundary centroid X and Y coordinates to your data records. The *centroid* of a boundary is its approximate center point.

For example, you have a table of wholesale outlet stores. You want to assign X and Y coordinates to each record according to county. MapInfo Professional reads the county name from your table, matches it with the county name in the search table, and assigns the county centroid coordinates to each of your records. The outlet locations will display at the county centroid in a Map window.

Geocoding by US_ZIPS.tab (Postal Code Centroid File)

US_ZIPS.tab is a point file that is included with the base MapInfo Professional package. The file consists of postal code centroid points for every postal code in the United States. This file can be used to geocode any database that includes postal code information. This file includes point postal codes that are assigned to single buildings or companies.

You can use any of the above methods to geocode your records, or you can use a combination of address and boundary geocoding to increase the potential for a successful match.

Geocoding by Server

If you have access to a geocoding server such as MapMarker or Envinsa Server, you can geocode using a more extensive data set.

Refining Your Geocoding Search

When geocoding, you might refer to objects whose names are used for other objects that do not interest you (for example, a city name that is common to two or more states). To eliminate this problem, refine your search by selecting another column (from, typically, another table). To further refine the search, specify the state for each city, rather than just the city name.

If your area of interest isn't unique enough for MapInfo Professional to automatically determine the position or location, you will need to refine your geocode search by specifying a particular boundary that contains your area of interest. This will provide MapInfo Professional with geographic locations on where to position your points.

Finding an Exact Street Match

When MapInfo geocodes, it attempts to find an exact match between source and target street names. That means that the addresses must be the same, character for character. However, matching is not case sensitive; upper and lower case letters are successfully matched with one another. MapInfo does not get an exact match in many cases and uses a file of abbreviation equivalences to improve its “hit rate”. Once you understand the various ways in which a match can fail, you are in a better position to understand what you can do to improve things.

The next table illustrates exact matching. The first column contains a street name from a target table and the second column contains the corresponding street name from a source table. The third column says why they do not match. The fourth column indicates whether the particular problem is one which can be corrected through using the abbreviation equivalence file. This table assumes that the addresses are the contents of a single column in a table. While the street number would often be in the same column, we don’t indicate street numbers here because they are handled differently than street names.

Target Address	Source Address	Comment	Correctable with Abbreviation File?
LaSal St	LaSalle St	“LaSal” is the wrong spelling.	No
La Salle St	LaSalle St	“La Salle” is the wrong spelling.	No
LaSalle Ave	LaSalle St	“Ave” does not match “St”.	No
LaSalle Street	LaSalle St	“Street” does not match “St”.	Yes
LaSalle Ave	LaSalle Av	“Ave” does not match “Av”.	Yes
LaSalle St.	LaSalle St	The target address has a period after “St”. That period is not in the source and causes the match to fail.	Yes
LaSalle	LaSalle St	“St” is missing from target.	No
LaSalle St	LaSalle	Target has “St” and source does not.	No
LaSalle St North	LaSalle St	Target has “North,” which is not in source.	No
LaSalle St North	LaSalle St N	Target has “North” instead of “N”.	Yes
North LaSalle St	N LaSalle St	Target has “North” instead of “N”.	Yes
North LaSalle St	LaSalle St	Target has “North,” which is not in source.	No
LaSalle St Apt 3	LaSalle St	Target has an apartment number which does not match anything in the source.	Yes

Target Address	Source Address	Comment	Correctable with Abbreviation File?
Tenth St	10th St	“Tenth” and “10th” do not match.	Yes
10th Av	Tenth Av	“10th” and “Tenth” do not match.	Yes
Saint John’s Lane	St John’s Lane	“Saint” and “St” do not match.	Yes

MapInfo’s matching process is not case-sensitive; it does not care whether a letter is upper case or lower case. This means that MapInfo treats the following as the same: Main, MAIN, main, maIN.

MapInfo Professional has a file called the Abbreviations File (MAPINFOW.ABB), which you can use to record acceptable alternate spellings for abbreviations. For example Av for Ave. or BL for Blvd. etc. Using this file increases your hit rate because there are more acceptable spellings for the same abbreviations.

- For more information, see *Solving Problems with Abbreviations and Substitutions* in the *Help System*.

Placing Geocoded Points

When you are geocoding to street level (by address), you can specify certain aspects of the resulting points’ position in relationship to the street. You can specify the offset of the point from the side of the street, and the inset of the point from the end of the street.

- For more information, see *Street Offset* in the *Help System*.

Street Inset

The street inset is the distance a geocoded point is set from the end of the street. You can specify a distance, or an inset can be a percentage of the length of the street. To avoid skewing the position of inset points, MapInfo Professional performs a proportional calculation that insets the points located at either end of the street the specified percentage or distance, but that decreases the inset as point locations approach the center. Points located at the center of the street remain in their original position.

- For more information, see *Street Inset* and *Controlling How Much to Inset and Offset a Point when Geocoding* in the *Help System*.

Matching Street Names

MapInfo begins by comparing the street address in the target table with the street addresses in the source table. When it finds an exact match, it may be finished or it may have to deal with region information, such as town, county, or postal code area.

When MapInfo cannot match the street name for a particular row, it applies the abbreviation file to the target address. This file consists of pairs of items, such as “STREET ST” and “AVE AV”. When MapInfo finds “STREET” in a target address, it changes it into “ST”; similarly it changes “AVE” to

"AV". MapInfo doesn't actually change your data in the target table. It substitutes abbreviations only for the purpose of making matches. The substitution is only effective during the matching process. The address in your table remains the same. It does not write the correct address form back to your table.

Once MapInfo has made an abbreviation substitution it attempts to match the resulting street name against the street names in the source table. When it fails to find an exact match at this point it:

- In Automatic mode, it moves to the next row
- In Interactive mode, it presents you with the closest matches and you pick the best match. MapInfo Professional then moves on to the next row.

At this point MapInfo will have done the best it can at identifying street names. The next step is to deal with address numbers for those addresses where it has matched a name.

Matching Address Numbers

Given that MapInfo has identified a street, it has to deal with street numbers. MapInfo stores address ranges with each street segment. MapInfo takes the street number from the target address and compares it to the ranges for each segment in the source table. For example, assume that we are trying to match "343 LaSalle St". MapInfo stores the beginning and ending address for each segment, differentiating between left and right sides of the street, as follows:

Name	FromLeft	ToLeft	FromRight	ToRight
LaSalle St	269	331	268	330
LaSalle St	333	375	332	374
LaSalle St	377	401	376	400

To match "343 LaSalle St" MapInfo Professional would scan the address ranges until it finds the one where "343" goes. Since 343 is between 333 and 375, the applications locates this address on that street segment (the middle one in the table). Once MapInfo Professional has matched an address number to a street segment it moves to the next row. When it fails to match a target street number to an address range on the appropriate street it:

- In Automatic mode, it moves to the next row
- In Interactive mode, it presents you with the closest matches and you pick the best match. MapInfo Professional then moves on to the next row.

At this point MapInfo Professional has done the best it can at locating address numbers. Note that one of the options (on the Geocode Options dialog box) is to automatically pick the closest address range in cases where there is no exact match—Use The Closest Address Number. For example, you might have "412" as an address number, but no range which includes that number. However, there is a range which goes from 346 to 400. Since that is the range closest to 412, that is where MapInfo will geocode 412 if you have chosen this particular option. The next step is to deal with addresses which have been located on more than one street.

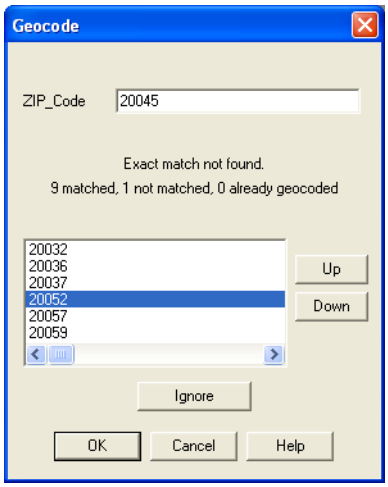
Matching to Region

When MapInfo is geocoding it checks to see how many occurrences of the target address exist. If there is more than one, MapInfo must decide which source address to use. If the user's target table has a column with region data, MapInfo can refine geocoding within a boundary.

For example, assume that you are geocoding a database of records in Cook county, Illinois. The address in the database reads 200 Washington St. Within the county of Cook, there are eight towns. Four of these towns have a Washington St. Three of the four have a 200 Washington St. MapInfo must now place the target address in the appropriate town. MapInfo uses region information to do this. MapInfo now matches a region designation for the target address against the region designator for the source addresses.

When you originally set up your geocoding operation, you had an opportunity to specify a region (boundary) to use in refining your geocoding operation. This dialog box displays when you choose Refine Search with Table and using Boundary Name Column.

If you specified a postal code table you enter the postal code and MapInfo Professional returns possible matches.



You could use any one of several different region types, including county name, town name, and postal code. Since almost all addresses contain postal codes, this is the most reliable way to refine your search. When you set MapInfo to use postal codes to refine its address matching, MapInfo will match the postal code of the target address against the postal code of the various matching source addresses. When it finds the correct match, it is finished with the geocoding process. MapInfo can now get coordinate information from the source table and use it to place a point object into the target table.

However, once MapInfo has completed this process, many addresses may be unmatched. You can match each one of them individually by geocoding in interactive mode. However, if you are working with a large database, you want to do as little of this as possible. There are other ways of improving MapInfo's geocoding performance.

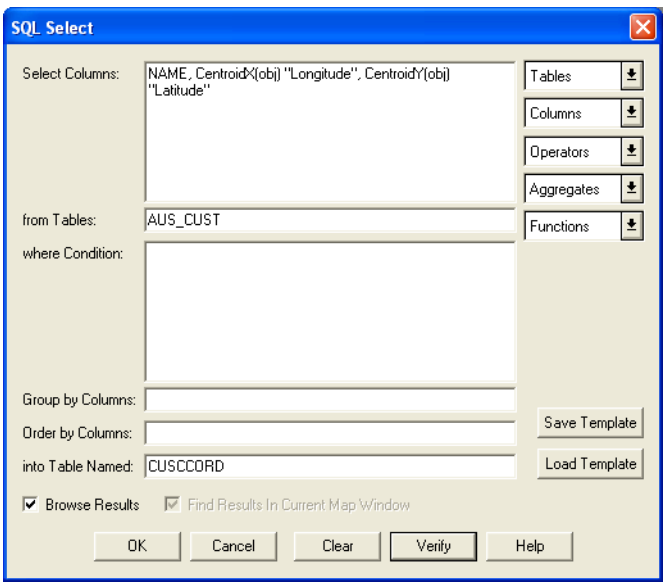
In the Geocode Options dialog box, you can specify that MapInfo automatically pick a different boundary, providing there is only one, from the one you specify (Use A Match Found In A Different Boundary). You might have had MapInfo geocode addresses to Northtown. One particular address,

"223 Locust Ct." is not in Northtown, but it is in Westville, and no place else. In this case, MapInfo would geocode "223 Locust Ct." to Westville. However, if MapInfo had found a "223 Locust Ct." in Westville and another one in Center Valley, it would not geocode the address to either town. It would leave "223 Locust Ct." ungeocoded.

For more information, see *After Geocoding* in the *Help System*. This section contains the following topics:

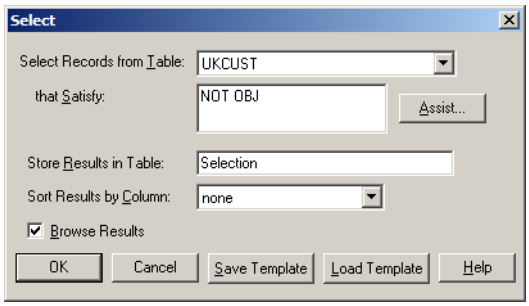
- *Finding and Examining Ungeocoded Records*
- *Extracting Longitude and Latitude from a Geocoded Table*
- *Extracting Longitude and Latitude into a New Table*
- *Extracting Longitude and Latitude into the Original Table*
- *Extracting a Table in a Projection Other than Longitude/Latitude*

Selecting Records Not Geocoded



Your geocoded table may have records that did not geocode, or you may have added new data to your table that have yet to be geocoded. There is a simple selection that can be performed to get a Browser list of the records not geocoded.

1. Open your table if it is not open already, and on the **Query** menu, click **Select**.
2. Fill in the **Select** dialog box. The expression used is "NOT OBJ." This selects all of the records that are not objects, i.e., not geocoded. Click **OK**.



Locating Newly Geocoded Points

One of the most satisfying results of geocoding is seeing your points displayed correctly on the map. Depending on the settings of your map, newly geocoded points may or may not be visible immediately.

Follow these steps to attempt to locate newly geocoded points on the map.

1. Make sure that the Map window is active by clicking in its title bar.
2. On the **Map** menu, click **Layer Control**. Make sure that the table you geocoded is listed in the **Layer Control** dialog box.

   If the layer you are looking for is not listed, click the **Add** button and add that layer.
3. In the **Layer Control** dialog box move the geocoded table to the top, just below the Cosmetic layer, to ensure that the points are not obscured by any other layer.
4. Make sure that the geocoded layer is set to visible. Click **OK** and exit **Layer Control**.

   If your points are still not visible, proceed to step 5.
5. On the **Map** menu, click **View Entire Layer**. Select your table and click **OK**. This should put all of the points from your table in view. You may see that your points are on the map, but are not in the location you expected them to be. If they seem misplaced, see **Ungeocoding Selected Records on page 222**.
6. If your points still do not display, on the **Map** menu, click **Layer Control**. Select the layer containing your geocoded points, and click **Display**.
7. Select the **Style Override** check box and choose a symbol style that will stand out on your map. Click **OK**, and click **OK** again to exit **Layer Control**.

After following these steps, if you have not found the points that you geocoded, try to select all of the ungeocoded records as described in the section *Selecting Points Not Geocoded*.

Result Codes

When you are using the result code option (in Geocode Options dialog box) MapInfo will generate a code for each record. These codes indicate the steps MapInfo Professional took to geocode the record, whether or not the geocoding was successful, and whether or not the match was exact. You

can use return codes to diagnose MapInfo's geocoding performance. It will help you spot "false positives" resulting from using various geocoding options and to analyze why some records have not been geocoded.

Ungeocoding a Table

Ungeocoding is the process of removing objects that have been attached to data records. There are times when it will be necessary to ungeocode an entire table or selected records in a table. For example, you have geocoded a database of customers using US_ZIPS.tab. Later, you want to geocode the database again, using street addresses instead of postal code centroids since the geocoding will be more precise. MapInfo Professional allows you to delete all graphic objects associated with this table. You can then geocode your database again, using more specific coordinates. Ungeocoding only selected records from your table is useful when the location information changes for a relatively small number of records, such as address changes in a geocoded list of customers.

To ungeocode and remove one or more of the objects in a table:

1. Make the table you are working with the editable layer of the active Map window.
2. Select the object or objects.
3. Click the Map window to make it active.
4. Choose **Edit > Clear Map Objects Only**.

To ungeocode an entire table:

1. On the **Table** menu, point to **Maintenance** and click **Table Structure**. The **Modify Table Structure** dialog box displays.
2. Clear the **Table Is Mappable** check box. Click **OK**.

CAUTION: **This action will remove all graphic objects from your table. This action cannot be undone. If you are unsure of losing your points, save a copy of the table first.**

3. A warning dialog box appears. If you are sure about removing all the objects, click **OK**.

   All graphic objects have been removed from your table.

Make sure that you don't ungeocode your source tables. Unless you have created a backup of that table, you will no longer be able to display that table as a map or use it for geocoding.

Ungeocoding Selected Records

To ungeocode and remove one or more of the objects in a table:

1. Make the table you are working with the editable layer of the active Map window.
2. Select the object or objects.
3. Choose **Edit > Clear Map Objects Only**.

For more information about trouble shooting your geocoding issues, see *Resolving Geocoding Issues* in the *Help System*. This section contains the following topics:

- *Resolving Spelling Errors in your Data Records*
- *Resoving Incorrect Address Numbers in your Data Records*
- *Working with the Abbreviations File*
- *When an Input Address Finds More than One Location*
- *Solving Problems of Space-Delimited Simple Substitution*
- *Resolving Simple Truncation*
- *Resolving Space-Delimited Truncation*
- *Resolving Simple Substitution*
- *Handling Legitimate Spaces*
- *Handling Special Characters*
- *Resolving Alternate Street Names, Street Names have Changed*
- *Resolving Incorrect Address Ranges*
- *Geocoding Post Office Boxes*
- *Correcting Inaccurate Town Names*
- *Correcting Geocoding Errors using Result Codes*
- *Examples of Geocoding Result Codes*

Putting Latitude/Longitude Coordinates on a Map

You may have a file that already contains X and Y coordinates, but not the point objects themselves that you want to display in MapInfo Professional. While the geographic information exists in the table, MapInfo Professional needs to create points to represent these coordinates before displaying them in a Map window. The Create Points command under the Table menu allows you to create points for each record in your database that has X-Y coordinate information.

Note: MapInfo Professional uses the coordinate fields in your table to create point objects. Records that already have graphic objects associated with them will be skipped during the Create Points operation.

For example, you have a table showing transmitter tower locations that was created by recording coordinates using a global positioning system. You want to display the locations on a map in MapInfo Professional. The table already has X and Y coordinate information but MapInfo Professional cannot display this information until you create points for that coordinate data that MapInfo Professional can read.

For more information, see the *Putting Latitude/Longitude Coordinates on a Map* in the *Help System*. This section also contains these topics:

- *Creating Points from an Excel or Lotus Table*
- *Creating Points from a Longitude/Latitude*
- *Creating Points in a Projection*

For more about the Degree Converter tool, see the *Tools* section of the *Help System*.

Dispersing Points Located in the Same Place

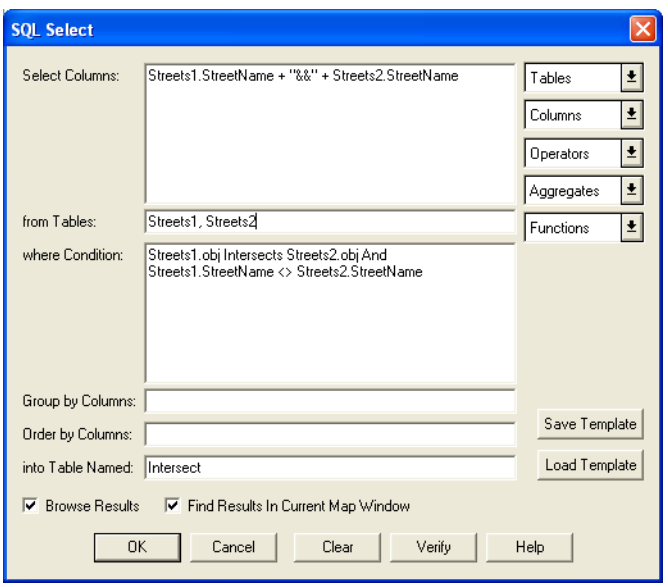
Depending on how you have geocoded your table, you may have several points that are placed at the same location, making it difficult to tell if you are viewing one point or many. For example, if you geocode a table of students by census tract, and view the results on your map, it appears that there is one dot at the center of each tract when there actually may be several there. To see all of your data, you may want to disperse the points over a small area. There are three methods for dispersing points: the Disperse Points tool (a tool that comes with MapInfo Professional), equal dispersion, and dispersion to the right.

- For specific instructions, see the *Dispersing Points Located in the Same Place* in the *Help System*.

Creating Points for Intersections

Many people working with street files are often interested in information that is located at intersections. For some, their only concern is the intersections. In MapInfo Professional you can geocode to intersections in your street file with the Geocode command, but it would be easier to work with a table that contained only intersections. For example, a municipality is interested in tracking the types of traffic control devices at each street intersection. It would be beneficial for them to make an entire layer that contains the intersection of every street.

- For specific instructions, see *Creating Points for Intersections in the Help System*.



Geocoding Data using a Server

Using the MapMarker and Envinsa Web Services, you have more choices for geocoding. For example, you can choose to geocode your records by street address or by postal code centroid, or by geographic centroids. If you have geocoded some records and some did not geocode successfully, you can set fallback conditions to locate those records. If you geocode and there are

no results, poor results, or multiple equal close results, the geocoding server can present you with interactive options so you can select among possible matches or change your input. Further, these web services allow you to set multiple matching conditions when more than one record matches the records you are geocoding and set offsets for placing points right in the geocode properties.

For companies and organizations that use MapMarker and Envinsa servers as a geocoding engine, you can now take advantage of the geocoding servers available to your whole enterprise. If your organization makes this server available on your intranet or over the Internet, you can use our geocoding web services from within MapInfo Professional to perform more sophisticated and accurate data geocoding.

To use MapInfo Professional with a geocoding server, you need MapMarker Java Server 4.0 or later or Envinsa 4.0 or later. MapInfo Professional supports any geography that is supported by Envinsa currently. Envinsa supports MapMarker Java Server V2, V3, and V4. Keep in mind that any Envinsa server only supports the data that is installed.

Before you can access a MapMarker or Envinsa geocoding service, you need to connect MapInfo Professional to its server. This process gives MapInfo Professional all the information it needs to access the geocoding service. You need to enter this information only once per service.

To set up a geocoding server and its preferences, see **Setting up a Geocoding Server on page 145** and **Setting the Geocoding Server Preferences on page 140**.

To geocode a single address using a geocoding service, see **Geocoding a Single Address using a Geocoding Service on page 471**.

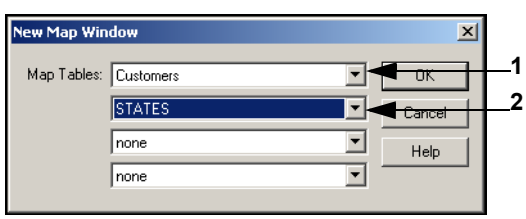
- To geocode a table of addresses using a geocoding service, see *Geocoding a Table using a Geocoding Service* in the Help System.

Displaying Your Data on the Map

Once you have converted your data and geocoded or created points for it, you are ready to display the results.

To display your data in a new Map window:

1. On the **Window menu**, click **New Map Window** and select the tables you want in your map. The order in which you select these tables determines the order they display.



1 *Select your data from this drop-down list.* **2** *Select the background map here.*

2. Click **OK** to display your data on the map you selected.

3. To change the symbol used to display your data, click the **Layer Control** , select the row with your data in it, and click the **Display** button to select new display options.

To display your data on an existing Map window:

1. Open the .tab files or .WOR files you want to plot your converted data onto.
2. Open the .tab files or .WOR files you just created and in the **Preferred View** drop-down box select the **Current Mapper** option.
3. Click **Open**.

After Displaying Your Data on the Map

Now that your data is there to see, make it say something to your audience. The whole world of MapInfo Professional functionality is open to you. For details on analyzing your data, see **Creating Thematic Maps, Legends, and Other Maps on page 339** or see **Drawing and Editing Objects on page 275** for more about customizing your map.

Finding Data on your Map

The **Find Selection in Current Map Window** command allows you to search and display a selection in the currently active Map window. You can not search for the selection in other types of windows (Browser or Layout, for example) using this command. You can access this option by pressing the <**Ctrl G**>.

The **Find Selection in All Windows** command allows you to locate the selection in all open windows (including a Browser window) that are currently open.

To access Find Selection in Current Map Window:

1. Perform the **Query > Find** or **Query > Find Selection**.
2. Choose **Query** > **Find Selection** > **In Current Map Window**.

   Note: Choosing the **In Current Map Window** option shortens the search time.

To access Find Selection in All Windows:

1. Perform the **Query > Find** or **Query > Find Selection**.
2. Choose **Query** > **Find Selection** > **In All Windows**.

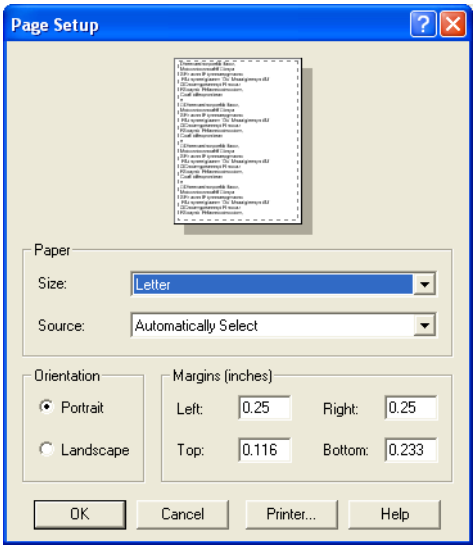
- For more information, see *Saving and Closing Query Tables* in the *Help System*.

Printing Your Results

Once you have created the perfect map or graph, you can easily print the individual windows. For presentation, use the Layout menu to bring together all views of your mapping session. Here, you can combine different types of windows to create an attractive and more informative presentation. On the **Window menu**, click **New Layout Window** to display a Layout window that you can use to arrange your maps, browse tables, graphs, legends, titles, logos, etc. See **Working with Layouts on page 411**, for tips and techniques about working in the Layout window.

Setting Up the Page

Before you print your map or layout, you will need to set up your page. In the **Page Setup** dialog box (on the **File** menu, click **Page Setup**), specify the paper size, orientation, and margins.



For detailed printing instructions, see *Printing your Map* in the *Help System*. These topics are also in this section:

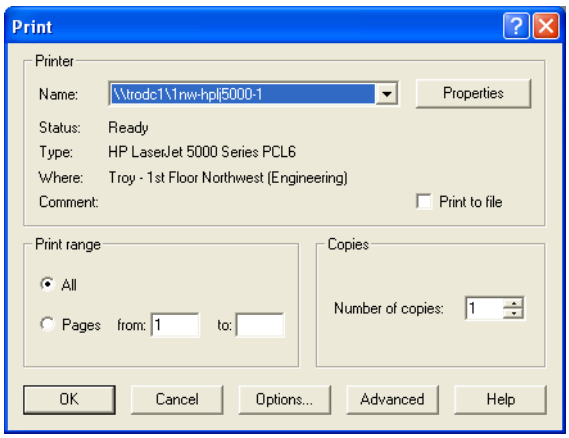
- *Saving or Restoring Printer Information in Workspaces*
- *Advanced Printing Options*
- *Graph/Browser/3DMap Printing Options*
- *Overriding the Default Printer*
- *Printing Maps to PDF Files*

Printing Your Map

When you have your page set up the way you want, you are ready to print.

To print your map:

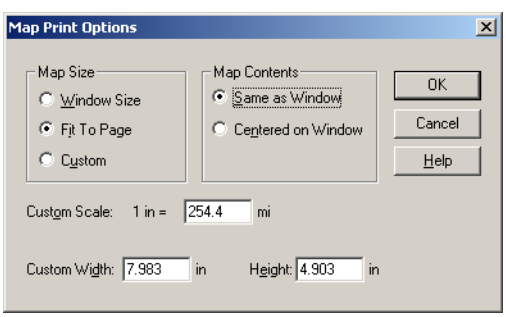
1. On the **File** menu, click **Print** to display the **Print** dialog box. This dialog box allows you to specify printer properties, a page range for printing, and the number of copies to print.



Note: You can override the default printer setting by selecting another print from the Name drop-down list.

2. If you need to change the size of the map, the orientation of your map or want to specify the scale or a custom width or height, click the **Options** button. If you are printing a map, the **Map Print Options** dialog box displays.

Note: If you are printing a graph or a browser or a 3DMap, your options will be different. See *Graph/Browser/3DMap Printing Options* in the *Help System* for more information.



Note: The Map Window Preference setting **Use Cartographic Scale** affects the entries in this dialog box.

3. Here you can specify the size of the map, how its contents will display, the scale, and its width and height. For details on the other print options, see *Graph/Browser/3DMap Printing Options* in the *Help System*. When you have completed your selections, click **OK** to continue.

- **Map Size** — Select the size of the map you are producing in this group; the options are Window Size, Fit to Page, and Custom. As you make selections, the Custom Scale, Custom Width and Custom Height entries change.

- **Window Size** — Click this button to print the map as it displays on your computer screen.
- **Fit to Page** — Click this button to fit the current map to the page size you have selected in your preferences.
- **Custom** — Click this button to enter your own custom scale, width, and height entries in the fields provided. Then, type the appropriate entries in the Custom Scale, Custom Width and Height fields.
- **Map Contents** — Select an option in this group to determine the map contents you want to print; the options are Same as Window and Centered on Window.
- **Same as Window** — Click this button to print the map contents as it appears in the Map window, with the same proportions and content as you see.
- **Centered on Window** — Click this button to center as much of the current map that fits on the page. When you select this option, the image may print on more than one page depending upon fit. In general when you select this option, MapInfo Professional assumes you want to select the **Fit to Page** radio button and selects this for you.

4. If your map is particularly complex (a large map, 3D, or one with 10 or more colors) there are more options available using the **Advanced** button. The Advanced Printing Options dialog box displays. (See *Advanced Printing Options* in the *Help System*). When you have completed your selections, click **OK** to continue.
5. After you complete your selections, click **OK** on the **Print** dialog box to print your results.

Printing your Map to a PDF File

MapInfo redistributes a third-party tool that allows you to print your MapInfo Professional maps to PDF files for sharing and distribution. When you install this utility, you can select it as a printer in your Windows Print menu.

Any customer or co-worker who has Adobe® Reader® can view and print this PDF file. Click here to go to the Adobe Reader download page or retrieve it from the installation CD.

- For more information, see *Printing your Map to a PDF File* in the *Help System*.

Viewing and Printing Text

Text size is handled differently in maps and layouts. You should keep these differences in mind when printing maps and layouts containing text objects and when fine tuning text.

Text Size in Layouts

In the Layout, the point size of the text is specified relative to the actual size of the page (that is, the size in which it will print), just as it is in word processing and desktop publishing programs. When you zoom in and out on a Layout, the text will be larger or smaller on the screen, but its specified point size (as indicated in its attributes box) remains the same.

The font and size of text objects in the Layout Window may not appear as they do on the printed page. There are several possible reasons for this: fonts available for screen display are not available for your printer, screen character width is different than printer character width, and screen resolution is different than printer resolution.

To find out the true size of a text object in the Layout Window, use the Select tool and click on the object. The edit handles indicate the object's true size.

Text Size in Maps

In maps, text size is specified relative to the screen. When you zoom in and out on a map, the size of the text on the screen and the specified point size of the text will change. If you zoom in, text will appear larger, as will all visible elements of the map. The point size of the text (as indicated in its attributes box) will be appropriate to the text being displayed on screen.

Troubleshooting Print Problems

Good first steps in troubleshooting a printing problem are to make sure you have downloaded and installed the latest patch for MapInfo Professional and are using the latest printer driver for your printer/operating system. You can get additional printer advice in the MapInfo Professional *Printing Guide,* which is located in the Documentation subfolder of your installation directory.

When we discuss printer issues, we make the following assumptions about your print environment:

- The printer/plotter has been installed properly
- The printer/plotter drivers have been installed correctly
- The printer/plotter is connected to the computer or to the network properly
- There is sufficient memory (on the print device and on the computer) to print your files

Any of these issues can affect your ability to print/plot your MapInfo Professional output. Our Technical Support professionals may be able to identify the these difficulties, but they are not within their control.

Note: Whenever we use the terms *print* or *printer* we also mean *plotter*.

When Printing a MapInfo Professional Object From Another Application

When you embed a MapInfo map or graph in another application (such as Word or PowerPoint), click outside the map/graph before you use the Print or Print Preview commands. This allows the container application to take over previewing or printing properly. This is particularly true if you have just made changes to the map or graph you are printing.

Working with Fill Patterns

Note that fill patterns on the first row of the Region Style dialog box are Windows standard and tend to print faster. The other patterns are bitmaps MapInfo has created for your use. You might want to consider this when you are selecting fill patterns. See also *Recommendations for Effective Pattern Scaling* in the MapInfo Professional *Help System* for more information regarding scaling and printing fill patterns.

Translucent Raster Maps/Grids and Windows 9X Don’t Mix

You cannot print a translucent raster map or grid on Windows 9X platforms or export them to EMF or WMF file formats. You need to use a non-metafile (for example, .BMP or .GIF) format to export raster images on Windows 9X.

Customers printing large images (such as destination page size D, E, or A0) no longer have the 28,000 pixel limitation. If you experienced printer difficulties in the past due to this limitation, you should notice a significant improvement in your printed images.

Sometimes the Older Driver is Better

When in doubt, if an older driver worked and the new one does not, go back to the older driver.

Make Room for the Metafile

Make sure you have plenty of temporary disk space, particularly if you are using the Print using the Enhanced Metafile option. The system is trying to create a layered bitmap locally on disk.

Spool Locally, Print Globally

Try spooling print jobs locally rather than at the plotter. This allows the computer to rasterize your output rather than the printer, which can be more efficient.

- For more print spooling instructions, see *Troubleshooting Printing Problems* in the *Help System*.

Note: *Speeding up the Printer:* If your printer has Fast, Normal, Best print quality options, we suggest you select **Fast** to improve printer speed.

6

Understanding Your Data

You cannot work for long in MapInfo Professional® without wanting to add more or enhance your own data in some way. This chapter teaches you how to get the most from your MapInfo tables and how to create reports with your data.

Sections in this Chapter:

- Working with MapInfo Tables 234
- Creating a Report of your Data 245

Working with MapInfo Tables

After you have brought your data into MapInfo and created .tab files, you can manage them within MapInfo Professional. You can view any database table in MapInfo Professional, once you have converted it to MapInfo format. Additionally you can add or remove fields, change the order, name, type, width, or index of any field. You can also specify or determine the projection of the table from this dialog box. You can also check if the table is mappable (contains map objects). To make these types of changes, see **Editing a Table's Structure on page 242**.

Keep in mind that you can only view the structure of a spreadsheet or database file that you convert into MapInfo Professional's table structure. See **Displaying your Data on a Map in Chapter 5 on page 200** for these instructions.

To view the structure of a table:

- On the **Table** menu, point to **Maintenance** and click **Table Structure**. The View/Modify Table Structure dialog box displays.
- For more information, see *Accessing StreetPro Data* in the *Help System*.

Adding to a Table

One important operation in maintaining tables is the ability to update the data contained in the table. MapInfo Professional's Update Column feature allows you to:

- Add a temporary column or update an existing column with data from another table
- Update a table
- Place graphic information into visible columns

Updating Information in a Subset of a Table

Use **Update Column** to update information in a subset of a table. For example, you could marquee the southeast of the United States, then use **Update Column** to set the "sales rep" field to the name of your sales representative for the Selection table.

You can update all the rows in a table or a selection of rows. To update a selection of rows you need to select the rows using **Select, SQL Select,** the **Select** tool**,** the **Boundary Select** tool, or the **Radius Select** tool, and then update the selection.

Adding a Temporary Column using Update Column

If you need to bring data from one table into another, you can use the Update Column command in MapInfo Professional. In fact to bring this data into the table, you can either add a temporary column or you can update an existing column. In both cases, use the **Table** menu to click **Update Column** to bring over the information.

You have tremendous flexibility with how information is imported and what information is transferred. You can perform aggregate functions to transfer averages, minima, maxima, sums, weighted averages, and proportional sums. You can also create expressions to derive additional information from the data.

- For specific instructions and an example, see *Adding a Temporary Column using Update Column* in the *Help System*.

Geographic and Descriptive Joins

A join allows you to join two tables. To do this, MapInfo Professional must know how to associate records in the two tables.

For example, assume you are shading STATES by the values in SALES. Obviously, you want all Pennsylvania sales to be associated with Pennsylvania, all Maryland sales to be associated with Maryland, etc. MapInfo Professional has two ways of doing this:

1. From a common descriptive field.
2. Geographically/graphically.

In this case, the most likely descriptive field contains the state name or an abbreviation for the state name. Thus the STATES table might have a field called **Abbr**, containing the abbreviation of the state name, and SALES might have a field called State, that contains the state abbreviation. MapInfo Professional matches the entries in these two fields so that information in the SALES State field is matched to the record having the same entry in the **Abbr** field of STATE, thus matching NY (sales) to NY (state), PA (sales) to PA (state), etc.

However, if both tables contain graphic information, MapInfo Professional can also make a graphic match.

For example, if you are a conservation official and you want to shade a map of COUNTIES according to the number of FIRES that occurred in the last year. Your FIRES database has been geocoded. In this case MapInfo Professional could examine the coordinates of each fire location and determine the county where the fire had occurred. That would allow MapInfo Professional to associate each fire record with the appropriate county.

- For more information, see *Specifying a Join Based on Descriptive Criteria* and *Specifying a Join Based on Geographic Criteria* in the *Help System*.

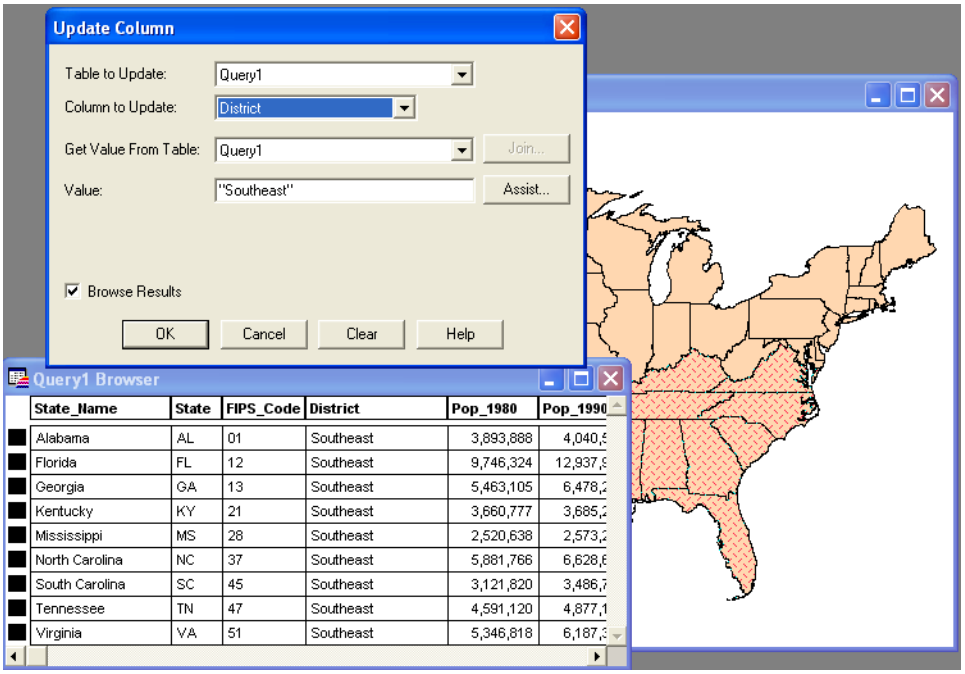
Updating a Table

For a quick visual way to update your table, select the objects in the Map window and use Update Column to update the table with the new value. This would be useful when you want to update a number of objects with the same value.

To include the District column in the STATES table:

1. Create the District column (on the **Table** menu, point to **Maintenance** and click **Table Structure**) in the States table.
2. Add a field for Districts.
3. Redisplay the STATES table in a Map window.
4. Select the appropriate states with the Marquee tool (or other selection method).

5. On the **Table** menu, click **Update Column** and fill in the dialog box as illustrated in the next figure. Be sure to put the value in quotes so MapInfo Professional does not treat it as a new column name.


Update Column
Table to Update:
Query1
Column to Update:
District
Get Value From Table:
Query1
Join...
Value:
"Southeast"
Assist...
Browse Results
OK
Cancel
Clear
Help
Query1 Browser
State_Name | State | FIPS_Code | District | Pop_1980 | Pop_1990
Alabama | AL | 01 | Southeast | 3,893,888 | 4,040,5
Florida | FL | 12 | Southeast | 9,746,324 | 12,937,8
Georgia | GA | 13 | Southeast | 5,463,105 | 6,478,2
Kentucky | KY | 21 | Southeast | 3,660,777 | 3,685,2
Mississippi | MS | 28 | Southeast | 2,520,638 | 2,573,2
North Carolina | NC | 37 | Southeast | 5,881,766 | 6,628,6
South Carolina | SC | 45 | Southeast | 3,121,820 | 3,486,7
Tennessee | TN | 47 | Southeast | 4,591,120 | 4,877,1
Virginia | VA | 51 | Southeast | 5,346,818 | 6,187,3

6. Click **OK**. MapInfo Professional creates a query table of the southeastern states with the District column containing the value Southeast.

7. Save the table to preserve the new information.

Appending Rows to a Table

Use the Append Rows to Table command to attach the records from one table to another. The two tables should have the same set of columns in the same order. To append data to another table:

1. On the **Table** menu, click **Append Rows to Table**. The dialog box displays.

2. Specify the table containing the records you want appended.

3. Specify the table to which the records will be appended and click **OK**.

If the corresponding columns do not have the same data type, a best fit is done to convert the data to the appropriate type. If the order of the columns is not the same between the two tables, use the Table Structure command to reorder the columns before using **Append Rows to Table**.

Note: If tables are mappable, the bounds of the map in one table must be large enough to allow objects from the other table to fit within it. Otherwise, the objects will be distorted to the bounds of the Map window. Use the Check/Set CoordSys Bounds tool to alter the map bounds of the table if this occurs. See **Using the Tools in the Tool Manager in Chapter 4 on page 195** for more about the CoordSys Bounds tool.

Appending One Table to Another

To append one table to another:

1. Choose **Table > Append Rows to Table**. The Append Table dialog box displays.
2. Choose the table you want to append from. Select a table in the **Append Table** drop down list.
3. Choose the table you are appending to. Select a table in the **To Table** drop down list.
4. Click **OK**. The status of the append operation displays.
5. Click **Stop** to halt the append process.

When the columns of the two tables are not ordered properly, so that columns with corresponding positions do not have corresponding data, use Modify Structure to change the order of the columns in one of the tables.

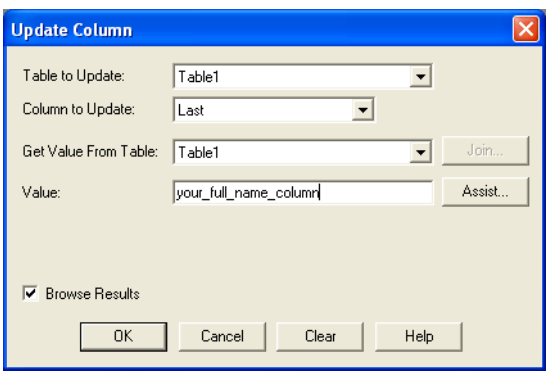
You can use **SQL Select** to reorder the columns of one of the tables and then append the results.

Parsing Data from One Column to Multiple Columns

If you have imported data into MapInfo Professional from another format, there is always the chance that the data will not come in exactly the way you want it. In some instances, items that should appear in separate columns may be put together in one column. The following is a series of column updates that parses one column of full names (first, middle, and last) into three parts. It works even if there is no middle name, or if there is only a last name.

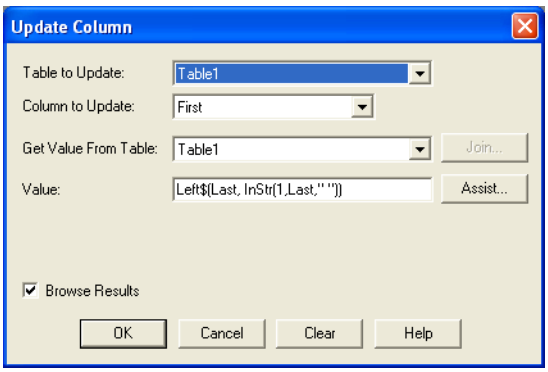
To parse data from one column to multiple columns:

1. On the **File** menu, click **Open** and open the table to be modified.
2. Add three new columns to your table. On the **Table** menu, point to **Maintenance** and click **Table Structure**. Add two character columns of size 15. Call them FIRST and MIDDLE. Then add a character column called LAST of size 30.
3. Put the full name into the column called LAST by choosing the **Table** menu, and clicking **Update Column**. Fill in the Update Column dialog box.



The column to update is LAST, and we get the Value from the column that has the full name in it. Remember we are only working with one table, so the **Table to Update** and **Get Value From Table** should be the same table. In the following example, the table is TABLE1 and the full name column is your_full_name_column. You should fill in your own values for these two items.

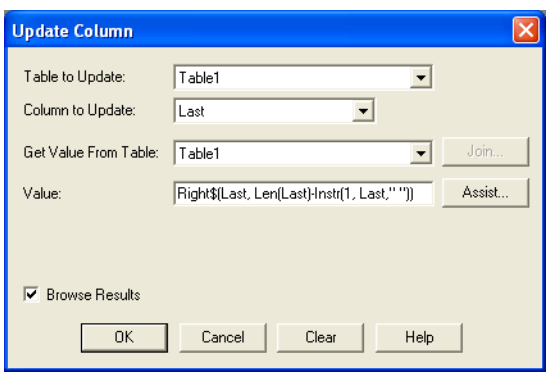
4. To parse the first name out of the full name column, choose the **Table** menu and click **Update Column**. Fill in the Update Column dialog box.



The Column to Update is: `FIRST`

The Value is: `left$(LAST, instr(1,LAST," "))`

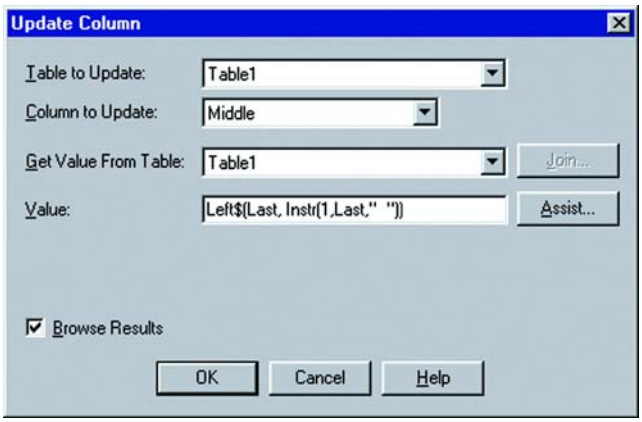
5. To parse the last name out of the full name column, on the **Table** menu, click **Update Column**. Fill in the Update Column dialog box.



The Column to update is: `LAST`

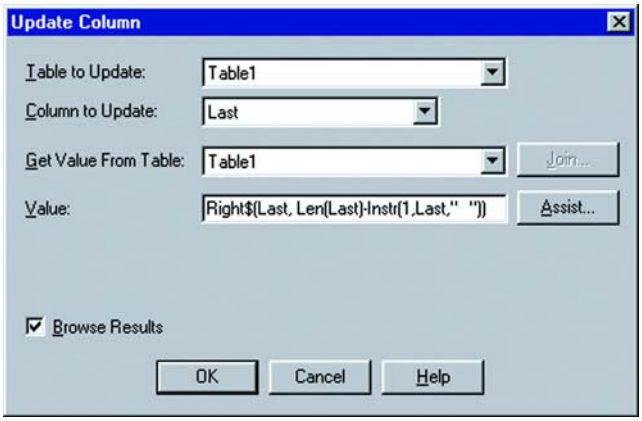
The Value is: `Right$(LAST, Len(LAST)-Instr(1,LAST," ")).`

6. To parse the middle name out of the full name column, on the **Table** menu, click **Update Column**. Fill in the Update Column dialog box.



Update the `MIDDLE` column with the Value: `Left$(LAST, Instr(1,LAST," "))`

7. Then update the LAST column again by returning to the **Table** menu, clicking **Update Column**, and filling in the dialog box.



The Value is: `Right$(LAST, Len(LAST)-Instr(1,LAST," "))`

8. Click **OK** to update the column.

Placing Graphic Information in Visible Columns

Update Column is also useful to put graphic information into columns so that it is visible. Tables that contain map objects store the graphic information about these objects invisibly. Using Update Column, you can bring some of that information into a column so it can be viewed in a Browser. Update Column with CentroidX(Obj), CentroidY(Obj) uses the Session Projection Preferences (if set), otherwise it defaults to Longitude/Latitude. For example, you want to display the longitude and latitude coordinates of a table of radio station point locations in a Browser. In this example, you are only working with one table, RADIOLOC, but you still use **Update Column** as in the Add Temporary Column example.

- For more information, see *Placing Geographic Information in Visible Columns* in the *Help System*.

Mouse Wheel Support for Browser Window

When you are working in the Browser window, you can use the mouse wheel to scroll through the records. Roll the mouse button down to scroll down the list, and roll the mouse button up to scroll up the list. You can still use the **Tab** key to scroll right and the <**Shift Tab**> keys to scroll left in the Browser window.

Adding a Row to a Table

You can add a temporary row to an editable MapInfo table.

To add a row:

1. On the **Window** menu, click **New Browser** window.
2. Choose an editable table from the drop-down list.
3. Click **OK** to display the table in a Browser window.
4. On the **Edit** menu, click **New Row** to add a row to the bottom of the table.
5. Type the new data into each appropriate column of the new row.
6. When you are finished adding rows, on the **File** menu, click **Save Table** to save the new data. The **Save Table** dialog box displays.
7. Click **Save** to save the new row(s).

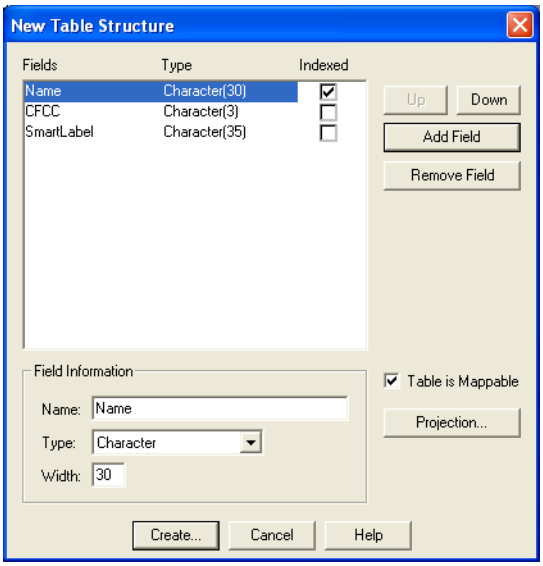
Creating a New Table

You can bring in data tables from several outside sources: dBASE, Excel, Access, Lotus 1–2–3, shapefiles, Grid, comma delimited, and delimited ASCII. You can also create your own database directly in MapInfo Professional. These databases can be opened and displayed as maps (providing they contain graphic objects), Browsers, or graphs.

To create a table in MapInfo Professional:

1. On the **File** menu, click **New Table**. The **New Table** dialog box displays.
2. Choose one or more from the following:
   - **Open New Browser** — Click this check box to display the new buffer in a new Browser window only.
   - **Open New Mapper** — Click this check box to display the new buffer in a new Map window.
   - **Add to Current Mapper** — Click this check box to display the new buffer in the current Map window.
3. Do one of the following and click **OK**:
   - To create a new table and new table structure, click **Create New**.
   - To create a new table based on the structure of an existing table, click **Using Table** and select from the list of open tables.

4. Choose **OK**. The **New Table Structure** dialog box displays.



*If you selected **Create New**, this dialog is empty. You can remove a field by highlighting it and clicking the **Remove Field** button.*

5. Choose **Add Field** to begin adding new fields to the database's structure. Give the field a name, type, width, and specify whether the field will be indexed.
6. Continue to add fields until you have the structure you want.
7. Use the **Up** and **Down** buttons to reorder the fields. Keep in mind that the order of fields in this dialog box (top to bottom) will actually display as columns (left to right) in the Browser window.
8. Choose **Create**. The **Create New Table** dialog box displays.
9. Specify a location for the new table in the **Save in** box.
10. Enter a name for the table in the **File Name** box.
11. Specify the file type in the **Save as type** drop-down list in one of these formats:
    - MapInfo (*.tab)
    - dBASE DBF (*.tab)
    - Microsoft Access (*.tab)
12. Click **Save**. If you chose either of the MapInfo Professional formats, MapInfo Professional creates your table. If you chose dBASE DBF, proceed to step 12. If you chose dBASE DBF, the **dBASE DBF Information** dialog box displays, asking you to specify a file character set. Choose the one appropriate for your language and click **OK**.
13. Click **Save** in the **Create New Table** dialog box. MapInfo Professional creates the new table.

    Note: Do not use "Districts" as a name for your base tables. MapInfo Professional uses "Districts" internally as a system table when beginning a redistricting session.

- For more information, see *Naming a File* and *Opening Multiple Tables* in the *Help System*.

Creating a New Table by Combining Objects Using Column

If you want to make a new map of the U.S. based on areas such as Midwest, Pacific Coast, Northeast, etc., you could combine all of the state data and create new objects where some common data value is the key to which the new map object states will belong.

To do this, you could draw a rectangle somewhere on the States map. Select some states around the rectangle and specify them as the target. Select the rectangle and do a split operation. The new objects will be created and each split object will have its same state initials. Then, use **Combine Objects Using Column** and specify the state initials fields as the grouping value. The states will be re-created.

The Combine Objects Using Column feature gives you the option of creating a new table for the newly combined objects:

1. Choose **Table > Combine Objects using Column** to display the Combine Objects using Column dialog box.
2. Choose the objects from the table you want to combine.
3. Choose the column you want the objects to be grouped by.
4. Choose **New** In the **Store results in table** drop-down list.
5. Press the **Next** button to display the New Table dialog box.
6. Press the **Create** button to display the New/Modify Table Structure dialog box.
7. Press the **Create** button to display the Create New Table dialog box.
8. Press **Save** and a new table is created.

Editing a Table's Structure

You can make changes to the structure of your table directly in MapInfo Professional. You can add or remove fields, change the order, name, type, width, or index of any field. You can also specify or determine the projection of the table from this dialog box. You can also check if the table is mappable (contains map objects).

The Table is Mappable option in the Modify Table Structure dialog box allows you to modify a table so you can map it or, when left cleared, it will ungeocode your table.

To change the structure of the table:

1. Choose **Table > Maintenance > Table Structure**. The View/Modify Table Structure dialog box displays.
2. Click the **View/Modify Table** drop-down list, a list of available tables displays.
3. Choose the table you want to modify.
4. Click **OK**.

The Modify Table Structure dialog box displays for editable tables and allows you to change the structure of a table. The View Table Structure dialog box displays for read-only tables and is only for viewing the table's structure.

Note: Keep in mind that you can only view the structure of a file that you bring into MapInfo Professional.

Copying and Renaming a Table

Because a MapInfo Professional table consists of two or more component files (STATES.tab, STATES.DAT, STATES.MAP, etc.), all of these files for a particular table must be in the same directory. If you move any of the component files to a different directory, you must move all of them. When you want to back up a table to diskette, you must back up all of the component files.

Because each table has at least two files associated with it, you cannot change one file name without changing all the other associated file names. Otherwise, MapInfo Professional would not know where to find all the files that constitute the table.

- For more specific instructions, see *Copying and Renaming a Table* in the *Help System*.

Deleting a Table

Deleting a table allows you to remove the .tab file and all component files associated with the table.

To delete a table:

1. On the **Table** menu, point to **Maintenance** and click **Delete Table**.
2. Choose the table to delete and click **OK**. A message displays to inform you that the table will be permanently deleted and the operation cannot be undone.
3. Click **OK** and MapInfo Professional deletes the table.

Deleting a raster table only deletes the *.tab file. Deleting a grid file removes both the *.tab and grid file.

Packing a Table

Packing a table allows you to compress tables to take up less disk space. You can choose to pack only tabular data or graphic objects or both. Packing tabular data removes deleted records. When you pack a table, MapInfo Professional requires that you have twice as much free space as the table takes up to handle a copy of the database as a scratch file.

To pack a table:

1. On the **Table** menu, point to **Maintenance** and click **Pack Table**. The Pack Table dialog box displays.
2. Choose a table from the **Pack Table** drop-down list.
3. Click the appropriate radio button to specify the type(s) of data.

4. Click **OK**.

Note: Packing a table can corrupt customized labels saved to a workspace. If you are going to be working with customized labels, pack the table before you create the labels.

Collecting Data into the Table using Update Column

MapInfo Professional provides a number of powerful aggregating functions that allow you to derive new information. These features are available in Update Column when you specify two tables in the **Update Column** dialog box. The aggregate expressions include A**verage, Count, Minimum, Maximum, Sum, Weighted Average, Proportion Sum, Proportion Average,** and **Proportion Weighted Average**. Each is defined in the next table.

Aggregate Expressions	Description
Average	Calculates the average of the values for all records in a group.
Count	Counts the number of records in a group.
Minimum	Finds the lowest value for all records in a group.
Maximum	Finds the highest value for all records in a group.
Sum	Calculates the sum of the values for all records in a group.
Weighted Average	Gives more weight to one value over another when averaging.
Proportion Sum	A sum calculation that is adjusted based on how much of one object is within another object.
Proportion Average	An average calculation that is adjusted based on how much of one object is within another object.
Proportion Weighted Average	A weighted average calculation that is adjusted based on how much of one object is within another object.

Note that average, count, min, max, sum, and weighted average operate on data values only. The proportion functions take geographic relationships into account.

Note: To find instructions for using the Update Column feature, see **Adding a Temporary Column using Update Column on page 234**.

- For more examples, see *Collecting Data into the Table using Update Column* in the Help System.

Browsing a Table

There are times when viewing the tabular data in a table is necessary. In MapInfo Professional, this is called browsing the table.

To browse a table:

1. On the **Window** menu, click **New Browser Window**.
2. Choose the table you wish to browse and click **OK**.

The Browser shows the fields of the data table (column headings) and the records of data (rows).

A Browse menu item gives you further functionality. On the **Browse** menu, click **Pick Fields** to display only the columns of data you want to see. If you wish to show information that is only implicit in the base table, in the **Pick Fields** dialog box choose Expression from the Fields in Table list. For more on expressions see **Deriving Columns in Chapter 9 on page 327**, or **Creating Query Expressions in Chapter 9 on page 316**.

To show or hide the Browser window grid, on the **Browse** menu, click **Options**.

To add new records to the Browser:

1. On the **Edit** menu, click **New Row** to add a row (or use **Ctrl-E**).
2. Enter text directly into each field. As you type, press **Tab** or **Shift-Tab** to move from field to field.
3. You must remember to save the new information to the base table before exiting the program.

The square box to the left of each record in the Browser window is the select box. Click it to select the record in the Browser window. If the Map window for the table is open, the record is selected as well. To add records to the selection, **Shift** and drag to select consecutive records, or **Shift-Click** non-consecutive records.

Selecting records creates a subset of the table that you can browse, map, or graph, just like the full table. More on selecting is found later in **Chapter 9: Selecting and Querying Data**. You can also create a report of your tabular data using the Crystal Reports functionality included with MapInfo Professional. The Crystal Reports *User Guide,* which is located in the Documentation subfolder of your installation directory to help you get the most out of this powerful report writing program.

Creating a Report of your Data

MapInfo Professional includes the full report-writing functionality of Crystal Reports. Crystal Reports enables you to create reports of your tabular data. The Crystal Reports *User Guide* is included online so that you can get the most from this program.

To create a report and print it:

1. On the **Tools** menu, point to **Crystal Reports** and click **New Report**. The New Report dialog box displays. It lists all the open tables.
2. Click the table you want to create a report for, and click **Report**. The Crystal Reports user interface displays.

3. In Crystal Reports, **Choose Report** > **Report Expert** to display the Create Report Expert dialog box. The Report Expert walks you through the selection of data, fields, fields to sort by, fields to total, and styles for your report. Click **Preview Sample** to see a sample of your report on the screen.
4. On the **File** menu, click **Print** to print your report.

Note: Tables with columns containing underscores, temporary column, do not display in the default Crystal Report. Use the Expert Wizard to access columns containing these elements.

Opening an Existing Report

To open an existing report:

1. Choose T**ools > Open Report**. The Choose Crystal Report dialog box displays.
2. Select the report from the dialog box.

Saving a Report

When you save a report, an .rpt extension is assigned to the report. The report is assigned the default name: (tablename) report.rpt. You may rename the report using the Crystal Reports Save As feature.

All .rpt files are saved in the directory specified in **Options> Preferences > Directories > Crystal Report** files.

7

Accessing Remote Data

When your data is remote, whether it is a remote Excel file or an Oracle table, the issue of retrieving it gets more complex. This chapter addresses the special circumstances that surround remote data access for use with MapInfo Professional®.

Sections in this Chapter:

- Understanding Remote Tables and Databases 248
- Accessing Data in Remote Spatial Databases. 251

- For information in using Oracle Workspaces, see *Using Oracle Workspace Tables in MapInfo Professional* in the *Help System*.

Understanding Remote Tables and Databases

Not all of the data you may need to work with is local. Sometimes you need to graph or display spatially data that is on several different computers in different locations. And this data can be in different formats and configurations. What MapInfo Professional has to do is synchronize all of that data to ensure that it displays properly on a map.

To access data that is located on a remote Oracle or other SQL Server based DBMS systems, your system requires:

- A database management system such as Oracle, MS Access, Informix, etc.
- Network support required by your DBMS (Oracle-SQL*NET; MS Access-none required)

If these resources are not in place, you will not be able to access the remote data from MapInfo Professional. If you try to connect to this data, warning messages display to explain that you do not have the required DLLs.

Supported Databases and Versions

MapInfo Professional supports the following spatial database servers:

- SQL Server 2000/2005
- Informix 9.x
  - Solaris 32-bit
  - HPUX
- Oracle Spatial 10G, 9iR2, 9iR1

Further, using ODBC drivers, you can access your data from MapInfo Professional using:

- Oracle ODBC Driver 9x
- SQL Server 2000/2005*
- Informix 3.x

To make your database work more productive, MapInfo Professional provides an interface for opening remote tables in EasyLoader. This utility gives you the ability to save tables to a remote database using Save Copy As and to create new tables on remote databases. Additionally it gives you the means to create a new table from existing tables. EasyLoader is available on the MapInfo web site. You can also open tables of data from the following databases and make them mappable but only for point data:

- Oracle 9iR2
- Oracle 10G
- MS Access XP
- MS SQL Server 2000/2005*
- Informix 9.4

About Linked and Live DBMS Tables

A linked table is a MapInfo Professional table that is downloaded from a remote database and retains links to its remote database table. The remote database table is known as a DBMS table. When MapInfo Professional downloads a table, it copies the entire contents of the table to the local machine. Any changes you make to the copy can be committed to the server table at any time. We often recommend that you use linked tables rather than live tables to improve performance.

Note: If you are linking to a large table, it will significantly slow down the performance of your system.

You can perform most operations on a linked table that you do for a regular MapInfo Professional table. For instance, you can view, edit, copy, and save a linked table just as you could a regular MapInfo Professional table. However, there are some things you can't do to a linked table. For instance, you can't pack a linked table. You can't modify the table structure of a linked.

You can download tables from a relational database management system such as Oracle, Informix, or Access. These downloaded tables can be used stand-alone or remain linked to the original server database. You can refresh these linked tables to rerun queries on a regular basis using the refresh button or menu button. After editing in MapInfo Professional, the data in a linked table is saved to the relational database management system in a manner that resolves any multi-editing conflicts.

A linked table may use one style for all objects within a table, or contain different styles for each row, called per row styles. There are two requirements for setting up per row styles:

- A row must exist in the DBMS table
- You must set up a map catalog entry to activate the row style.

Note: Setting up a per row styles is optional.

DBMS Drivers

Before you can access an SQL database, you must have the appropriate DBMS driver for the type of database, and set up a DBMS data source for the data. The DBMS drivers were installed during MapInfo Professional installation, or afterwards, using the DBMS Administrator in your Windows Control Panel. You can install additional DBMS drivers at anytime using the DBMS Administrator. A DBMS driver is a dynamic–link library (.DLL) file that MapInfo Professional uses to connect to an SQL database. Each type of SQL database requires a different DBMS driver.

Linked Tables and Metadata

MapInfo Professional stores information about a linked table in the TAB file's metadata, which is not displayed on the map. MapInfo Professional uses metadata to manage transactions between MapInfo Professional and the server database. Two of the most important kinds of information stored in the metadata include the connection string and the query you build from the DBMS Table Wizard, or Expert dialog box.

- For more information, see *Resolving Editing Conflicts when Saving a Linked Table* in the *Help System*.

About Live Access Tables

You can access remote data as a live access table using MapInfo Professional. It is called a live access because there is no local copy of the data, that is, all operations against the data go directly to the server. This differs from linked tables, which download a snapshot from the remote database into a native MapInfo Professional table.

You can perform most operations on a live access table that you do for a regular MapInfo Professional table. For example, you can view, edit, copy, and save a live access layer just as you can a regular MapInfo Professional table. However, you cannot pack or modify a live access table's structure.

You can create live access tables with or without a cache. The cache is a memory cache, which contains only the rows that are in the map display for that window. This optimizes certain operations such as ToolTips, labeling, etc. on the map. The cache is automatically updated when the view of the map changes, (for example, zooming or panning).

When the live access table is creating a new Map window, the initial view is determined by the entry in the MapInfo_MapCatalog table. The columns DB_X_LL_DB_X_UR_DB_Y_UR describe a rectangular area that is the initial map display. If the live access table is being added as a layer to an existing Map window, the layer will be fit to that Map window.

MapInfo Professional stores information about a live access table in a TAB file. This information is known as metadata. MapInfo Professional uses metadata to store information about the live access table that is needed to manage transactions between MapInfo Professional and the server database. Two of the most important kinds of information stored in the metadata include the connection string and the query you build from the DBMS Table Wizard, or Expert dialog box.

Limitations in Creating a Live Table

This is a list of known problems/issues with live access:

- Every table must have a single unique key column.
- FastEdit is not supported.
- With MS Access if the key is character, it will not display rows where the key value is less than the full column width for example, if the key is char(5) the value 'aaaa' will look like a deleted row.
- Changes made by another user are not visible until the data is refreshed from the server. In addition, if cache is on another user's updates may not appear until the cache is invalidated by a pan or zooming out.
- There will be a problem if a client-side join (through the SQL Select menu item or MapBasic) is performed against two or more SpatialWare tables that are stored in different coordinate systems. This is inefficient (it is better to do the join in the SQL statement that defines the table).

Limitations of Live Access to Remote DBMS Tables

Using live access tables to determine the number of rows is not appropriate for all tables. It works best on large tables, where the number of rows remains stable; that is, new insertions or deletions in the table do not occur on a regular basis.

If the total number of rows stored in the MapCatalog is out of sync with the actual number of rows in the table, problems occur. The map will always include all of the map objects, but other things may not work correctly. For example:

- The row count displayed in the Browser will be incorrect.
- The MapBasic statement to fetch last will not return the correct row.

Thematic maps, particularly ranged thematic maps, may be wrong.

- For more information, see *Improving Live Access Performance* in the *Help System*.

Accessing Data in Remote Spatial Databases

To use your RDBMS tables with MapInfo Professional most effectively, you need to set them up so that you can store coordinates or more complex spatial data and then retrieve them. This will also allow you to geocode your remote table and assign coordinates to each record in the table.

There are four prerequisites for storing and retrieving spatial objects in a DBMS table:

- Coordinate values for the objects must be stored in columns of the remote table as numbers, or as a spatial column if the database supports it, such as SpatialWare, or Oracle Spatial. See **Storing Coordinate Values in a Remote Table** for these instructions.
- A spatial index column may be included to increase performance on queries against the coordinates. See **Creating a Spatial Index Column** for these instructions.
- You must create a special table on the DBMS system known as the MapInfo_MapCatalog. (MapInfo Professional creates this automatically when you use the EasyLoader.) You create only one catalog per database. See **Creating a MapInfo_MapCatalog** for these instructions.
- You must supply information about mappable tables to the MapInfo MapCatalog using the Make Table Mappable command. (This is for tables the EasyLoader does not upload.) See **Making a Remote Table Mappable** for these instructions.

Storing Coordinate Values in a Remote Table

The coordinate values for the spatial data must be stored in columns of the remote table. This is a data creation task and can be done at any time. Possible methods for adding the spatial columns include:

- There may already be existing coordinate data.
- Use the EasyLoader application to upload a MapInfo Professional table to a database supported by MapInfo Professional.
- Make a remote table mappable in order to geocode. See **Making a Remote Table Mappable** in this chapter.
- Add coordinate values to a MapInfo Professional table, export it to a text file, and import it to your database.

For more information on how to use the EasyLoader tool, please view the *Tools* section of the *Help System*.

Creating a Spatial Index Column

To increase performance on queries against the coordinates, a spatial index column can be included. This is a data creation task and can be done at any time.

Creating a MapInfo_MapCatalog

Use EasyLoader to create a MapInfo_MapCatalog. MapInfo Professional stores information about where the spatial columns are located in a special table on the DBMS known as the MapInfo_MapCatalog. There must be one catalog per database. The application EasyLoader can be used to create this catalog for each database: Oracle 9, Informix, SQL Server, and MS Access. These applications will need to be customized for any other DBMS, or you can follow the procedure for manually creating a map catalog. This is a one-time only task per database and is required before any tables on that database can be mapped in MapInfo Professional.

These related topics are in the *Help System*:

- *Creating a MapInfo_MapCatalog Automatically*
- *Creating a MapInfo Map Catalog Manually*
- *Spatial Index Types*
- *Updating Spatial Bounds in the MapInfo MapCatalog*

Making a Remote Table Mappable

MapInfo Professional holds catalog information about mappable tables from the Make Table Mappable command. Creating the entry for a table is a once-per-table task and is required before this specific table can be mapped in MapInfo Professional.

The Make DBMS Table Mappable command makes a remote SQL database table (DBMS table) mappable in MapInfo Professional. Any MapInfo Professional table may be displayed in a Browser, but only a mappable table may have graphical objects attached. Only mappable tables can display in Map windows. Use the Make Table Mappable command only for tables that you cannot upload with EasyLoader.

In the Make DBMS Table Mappable command provide MapInfo Professional with the following information from the remote database table so that the table can be mapped in MapInfo Professional:

- The column(s) containing the spatial data to map the table (not applicable to relational Oracle SDO)
- The projection used by the remote database table
- The spatial index column from the remote database table (used by MapInfo Professional to speed access of the spatial data and improve performance)
- The symbol to use for objects
- Per row styles, if your table is set up for it, and the MapInfo_ MapCatalog has the appropriate column structure
- Object type for Spatial databases
- Table Bounds (control the extent of the bounding rectangle for the Map window)

MapInfo Professional takes this information and stores it in a table called the MapInfo_MapCatalog. Every time you use a DBMS table MapInfo Professional checks the catalog to see if the table is mappable. As a result, you only have to make a DBMS table mappable once. It will always remain mappable. However, one spatial index column entry per table is allowed in the Map Catalog. Therefore, only one spatial column can be mappable at a time. If the table has more than one spatial column and you want to map another spatial column, you must drop the spatial column currently in the Map Catalog and make the table mappable using the new column.

Once you have the prerequisites in place you are ready to connect to your datasources and the database tables you want to work with. If you are not familiar with the details of your remote database type, discuss your needs with your database administrator to find out the basic information required to connect to your database.

- For more information, see *Making a DBMS Table Mappable* and *Changing the Symbol Style in a Mappable DBMS Table* in the *Help System*.

The Help System contains these additional related topics:

- *Understanding Per Row Object Styles*
- *Making a DBMS Table Mappable for Geocoding*
- *Changing the Symbol Style in a Mappable DBMS Table*

Opening a Connection to an ODBC Data Source

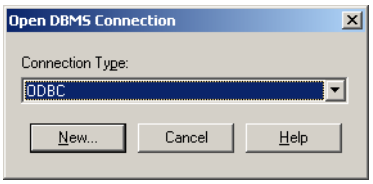
A data source is the location of a specific database. For example, CUSTOMERS could be the name of the data source that provides access to one or more Oracle tables located in a specific directory on a specific network drive. Once connected to the CUSTOMERS data source, you could download information from any of the Oracle tables into a MapInfo Professional *linked table* or use the information directly by opening the table as live access. You could have several data sources, each providing access to different databases in different locations.

Open Database Connectivity is a standard for accessing disparate database systems. It is the oil that moves the wheels of inter-database communication. MapInfo is committed to making this important interface work for your organization.

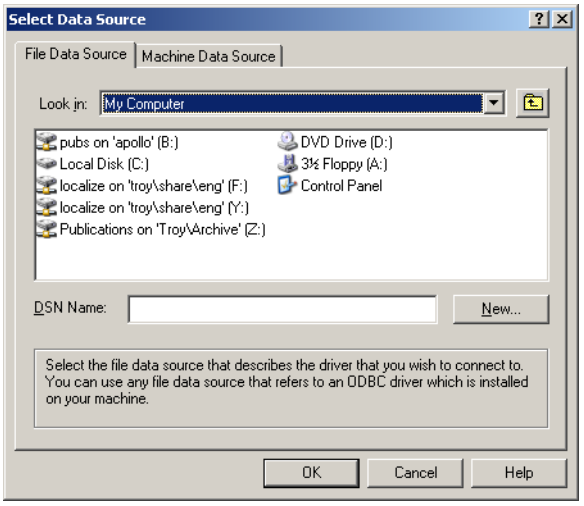
Before you can download a DBMS table, you must connect to the specific data source where the data to be downloaded resides.

To connect to a new data source through ODBC:

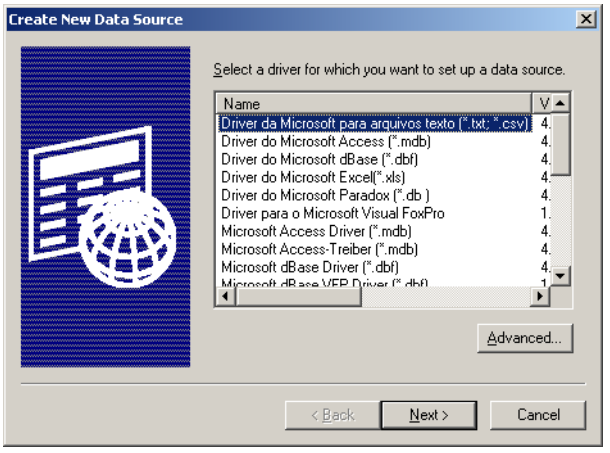
1. Choose **File > Open DBMS Connection**. One of the following happens:
   - If you installed the Oracle Spatial (OCI) and ODBC support, this dialog displays. Choose whether to create an ODBC or Oracle connection and click **New**. When you select **Oracle Spatial**, a different process occurs, see **Opening a Connection to an Oracle Spatial Data Source on page 255** for these instructions. When you select **ODBC**, the Select Data Source dialog box displays.



- If the ODBC driver is the only one installed, the Select Data Source dialog displays.


Select Data Source
File Data Source
Machine Data Source
Look in:
My Computer
pubs on 'apollo' (B:)
Local Disk (C:)
localize on 'troy\share\eng' (F:)
localize on 'troy\share\eng' (Y:)
Publications on 'Troy\Archive' (Z:)
DVD Drive (D:)
3½ Floppy (A:)
Control Panel
DSN Name:
New...
Select the file data source that describes the driver that you wish to connect to. You can use any file data source that refers to an ODBC driver which is installed on your machine.
OK
Cancel
Help

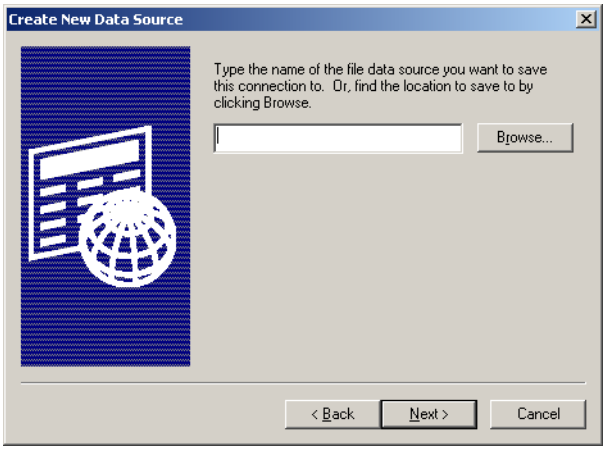
2. Click **New** to display the Create New Data Source dialog box.


Create New Data Source
Select a driver for which you want to set up a data source.
Name
Driver da Microsoft para arquivos texto (*.txt; *.csv)
Driver do Microsoft Access (*.mdb)
Driver do Microsoft dBase (*.dbf)
Driver do Microsoft Excel(*.xls)
Driver do Microsoft Paradox (*.db)
Driver para o Microsoft Visual FoxPro
Microsoft Access Driver (*.mdb)
Microsoft Access-Treiber (*.mdb)
Microsoft dBase Driver (*.dbf)
Advanced...
< Back
Next >
Cancel

From this wizard dialog box you select a driver and choose a name for the connection. You can add multiple data sources, each one associating a driver with data you want to access using the driver. You need to give each data source a name that uniquely identifies that data source.

3. Select the appropriate driver for this database connection from the list and click **Next** to display the next dialog box.

   To enter the driver-specific keywords for the database you are connecting to, click the **Advanced** button. We recommend you leave the **Verify this connection** check box selected. Click **OK** to continue.


Create New Data Source
Type the name of the file data source you want to save this connection to. Or, find the location to save to by clicking Browse.
Browse...
< Back
Next >
Cancel

4. Do one of the following and click **Next** to continue:
   - Type the name you want to use to identify this connection in this field or
   - Click the **Browse** button to identify the location of the connection and save it.

   For example, If you create a data source for an Oracle database that contains customer tables, you might name the data source, "CUSTOMERS".

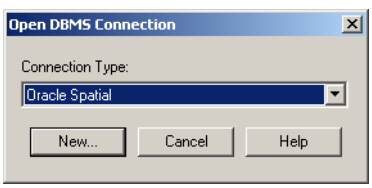
5. Once you have set up your data source, MapInfo Professional displays the data source names in the Select Data Source dialog box, for easy selection.

Opening a Connection to an Oracle Spatial Data Source

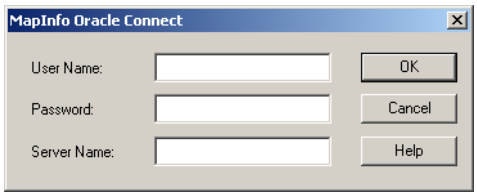
You can only connect to an Oracle database or the Oracle instant client on the machine if you have the Oracle client installed and the OCI driver.

To connect to a new data source using the OCI:

1. Choose **File > Open DBMS Connection**. If you installed the Oracle Spatial (OCI) driver, the Open DBMS Connection dialog displays.



2. Choose **Oracle Spatial** and click **New**. The MapInfo Oracle Connect dialog box displays.



You may need to speak to your Oracle Database Administrator to get this information.

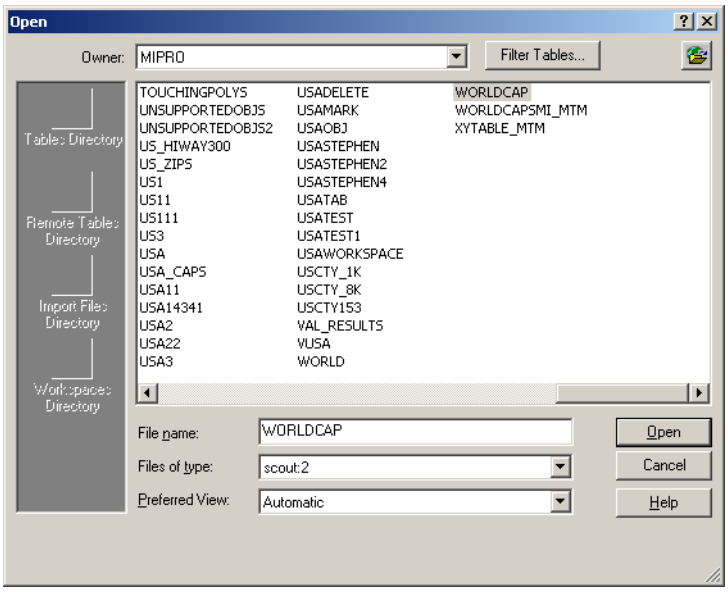
3. Type your user name and password for the Oracle server connection in the fields provided. Type the name of the server on which your tables are located in the **Server Name** field. Click **OK** to continue.
4. To access the tables on the selected server, select **File > Open** and click arrow beside the **Files of type** drop-down list. Scroll to the bottom of the list to find the connection you created. For more details about opening a table from this server, see **Opening a Database Table from a Connection**.

Opening a Database Table from a Connection

Once you have opened a connection to a database, the connection is available each time you select **File > Open** and click the **Files of Type** drop-down list. From there you can open live or linked tables located on that server through the connection you have created.

To open a particular table based on the data source connection:

1. Choose **File > Open** to display the Open dialog box.
2. From the **Files of type** drop-down list, select the database connection you created in **Opening a Connection to an ODBC Data Source on page 253**.

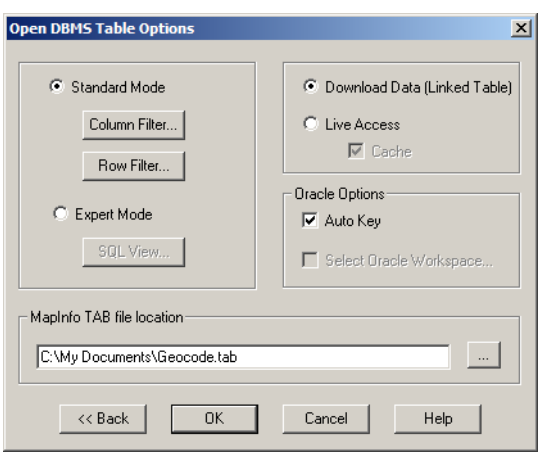


1

*1 This list displays the remote tables available on the selected data source. Connections you add to the **Files of type** drop-down list appear at the bottom of the list and contain a sequential number that indicates the order in which the connection was added.*

Note: If you do not see the table you are looking for in the list, click the **Filter Tables** button and check the filter options to see if your view is restricted. Check the **Owner** drop-down list too to see if there are other schemas on the server you selected that may contain the table you are looking for.

3. Select the table in the list you want to open and click **Open**. The Open DBMS Table Options dialog box displays.

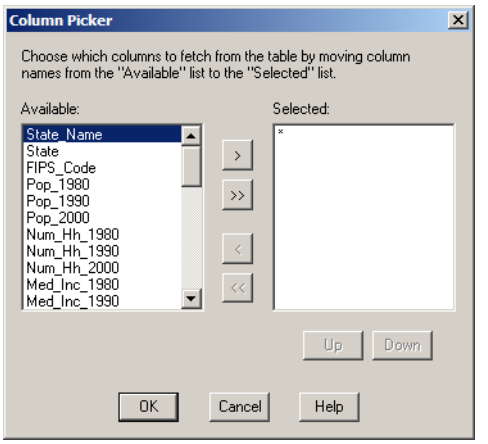


Use this dialog box to select the type of view you want of your remote data.

- **Click the Standard Mode** to open particular rows or columns of the selected table. The instructions in this description assume you are opening the table using Standard Mode.

- **Click the Expert Mode** to create a SQL Query to open particular rows or columns of the selected table.

4. Click the **Column Filter** button to specify the columns to download. The Column Picker dialog box displays.



*An asterisk (*) appears in the **Selected** list when you first open this dialog box. If you leave the asterisk, MapInfo Professional retrieves all the columns in the table from the remote database.*

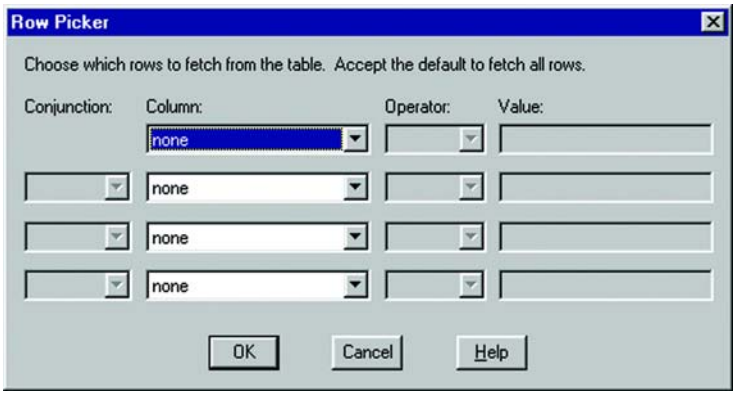
   a. To move the columns you want to display from the table from the **Available** group to the **Selected** group using the arrow buttons. The single arrow keys move one selected column at a time. The double arrow buttons move all the columns at once from one list to the other.

   b. To change the order of the selected columns in the Selected list, highlight the column you want to move and click the **Up** and **Down** buttons until the column is positioned correctly.

   c. Click **OK** to complete your selections.

Note: If the table is mappable, the **Available** list also displays an additional column called OBJECT, which refers to the spatial column. You can select it to download point objects from the table. If the table is spatialized, MapInfo Professional downloads lines, points, and polygons depending on what the table contains.

5. Click the **Row Filter button** to select the row data that you want MapInfo Professional to download.



Leave this dialog box as it is to retrieve all of the rows pertaining to the columns you selected.

a. Select the column, operator, and value entries that match the data you want to retrieve from the selected table.

Note: This is the same as specifying the WHERE clause in a SQL query.

b. In the Column list, choose the column(s) from which you want to filter rows.

c. If you are filtering rows for one column, select a column, operator, and value. If filtering rows on more than one column, select a column from the next drop-down list. This also activates the next row of fields for data entry.

d. Choose how you would like to filter the rows using the Operator and Value boxes. See *Notes for Completing the Row Picker Query* in the *Help System* for assistance in completing these entries the way you want them.

Click **OK** when you have finished filtering the rows.

6. When you have completed your Standard Mode selections, do one of the following:

- To open a linked table, click **Download data (Linked Table)** to download the data and create a linked table. Clear the box for live access.
- To open a live access table, click **Live Access** and choose whether to click the **Cache** check box.

  Select the **Cache** check box to keep attributes and objects that have been read in memory. If you perform an operation such as zooming in they do not need to be fetched from the database (since MapInfo Professional looks in memory for a record you may not see the latest updates). If you select the Cache check box, another user's updates may not appear until the cache is invalidated by a pan or zoom out operation.

  Clear the **Cache** check box, to retrieve all of the data from the database whenever it is needed. This option provides the most current data but it is be less efficient.

7. Click **OK** to retrieve the data you selected and save it to the table name you specified.

- For more information, see *Opening a DBMS Table from the Open Table Dialog Box* and *Notes for Completing the Row Picker Query* in the *Help System*.

Creating a New DBMS Table

To create a new DBMS table:

1. Choose **File > New Table**. The New Table dialog box displays.
2. Specify how you want the table opened, (Browser, Mapper, Current Mapper).
3. Specify whether you want the table structure to be based on an existing table or you want MapInfo Professional to create a new table structure.
4. Press the **Create** button. The New Table Structure dialog box displays.
5. Specify the field name, field type, number of characters (width), and whether or not the field is to be indexed for each field in your new database.

   You also indicate whether the table is mappable by associating graphic objects with records and, if so, whether the map is to be an earth or a non-earth map.

   If you are using the structure from another mappable table, then MapInfo Professional sets the new table projection to the projection of the source table. Collectively, this information is the structure of your database.
6. Press the **Create** button to display the Create New Table dialog box.
7. Select a DBMS database from the **Save as type**: drop-down list. The DBMS connection controls display, (Owner: box and Filter Tables: button).
8. Specify a file name and press the **Save** button. The New DBMS Table Options dialog box displays.

   This dialog box has three tabs, **General**, **Spatial**, and **Styles**. However, If you cleared the **Make Table Mappable** check box in step 4 then the DBMS Table Options dialog box will only have the **General** tab. Press the **Help** button to display specific information corresponding to the tab you are currently in.

   Follow the instructions listed below, depending upon the tabs that display.
9. Click the General tab and complete the appropriate selections.

   TAB file location
   Displays the name and path of the .tab file that will be created. You can manually type a filename or use the Save As dialog box (via **Browse** button) to choose a filename. MapInfo Professional uses the last directory where you saved a DBMS .tab when constructing the default filename full path. If this directory does not exist, then the Remote Tables preference directory is used. The filename part of the default path is based on the name of the specified DBMS table name.

   Browse button
   Displays the Save As dialog box so the user can choose a .tab filename. Initialized with the text in the .tab filename edit box.

   Download Data (Linked Table)/Live Access/Cache buttons

   Download Data
   When the Download Data (**Linked Table** button is selected) you have a linked table. Unchecked provides Live Access. MapInfo Professional will remember the last used settings and continue to use them until you change the settings.

Cache

When the **Cache** check box is selected, you are using the local buffer. Access time to data is faster but you don't get the most current version.

When the **Cache** check box is cleared, you are always reading the remote data, which is the most recent version.

Note: The **Cache** check box should only be enable if the **Live** option is selected. Refresh occurs when you zoom, pan, or pack.

Key Column:

Allows you to specify a key column for the new table. Without a key column a DBMS table cannot be open as live access and can only be opened read only as Linked.

If the **Key Column** check box is selected, then the corresponding combo box is enabled. You can either choose a column that was specified in the New Table Structure dialog box or specify a new column by typing into the combo box's edit control.

By default the **Key Column** check box is selected and a new column is specified. The default name of the new column depends on the DBMS connection: **MI_PRINX** for Oracle Spatial, **SW_MEMBER** for all others.

10. Click the Spatial tab and specify the index type and coordinate column selections.

Index Type:

This setting determines the type of spatial indexing used on the table. Types MapInfo (MICODE) and XY are always available. Server specific types may also be listed. The index type selection affects the state of the other three controls in this tab.

Index Column:

This control is used to specify the primary spatial index column. It's always available, except when the index type is XY.

X Coordinate:

This control is used to specify the X or latitude column in the database. It's only available for MapInfo (MICODE) or XY types. You can either choose a float column that was specified in the New Table Structure dialog box or specify a new column by typing into the combo box's edit control.

Y Coordinate:

This control is used to specify the Y or longitude column in the database. It's only available for MapInfo (MICODE) or XY types. You can either choose a float column that was specified in the New Table Structure dialog box or specify a new column by typing into the combo box's edit control.

11. Click the Styles tab and complete the appropriate selections.

Per Row Style

Check the Per Row Style box to enable per row symbology. The style info for each object is maintained in a character column of the table. If unchecked, then the style of all objects in the table is determined by the default object styles (maintained in the Map Catalog). If **Per Row Style** is checked, then the **Style Column** combo box is enabled. By default **Per Row Style** is checked and a new column named MI_STYLE is specified.

Style Column:
You can either choose a character column that was specified in the New Table Structure dialog box or specify a new column by typing into the combo box's edit control.

Default Object Styles:

Symbol/Line/Region
The default object styles are used when **Per Row Style** is not turned on for a table, or the style info for a particular object does not exist (the style column for that row is empty). The default style info specified here is entered into the map catalog. The default symbol, line and region settings within MapInfo Professional are used to initialize these controls.

12. Press **OK** to open the DBMS table according to your specifications above.

Refreshing Live and Linked Remote Tables

When you open a remote table as a "Live" table, MapInfo Professional enables the **Refresh** toolbar button so you can refresh the data in that table. This same functionality is available for linked remote database tables.

You can refresh a MapInfo Professional linked table with the most recent data residing on the remote database for that linked table.

To refresh a linked or live table:

1. Do one of the following:
   - Use the **Refresh DBMS Table** button on the DBMS toolbar
   - On the **Table** menu, point to **Maintenance** and click **Refresh DBMS Table**.

   Using either method, the Refresh Table dialog box displays.
2. Choose the name of the table to be refreshed from the refresh table list.
3. Choose **OK**. The specified table is refreshed.

Unlinking a Table from a Remote Database

You can unlink a table from its remote database with the Unlink DBMS Table command. Unlinking a table removes the link to the remote database. This command does not work if edits are pending on the linked table. You must first update any pending edits with the Save Table command. The table linkage is removed. Fields that were marked non-editable are now editable. The end product is a normal MapInfo Professional base table.

To unlink a table:

1. On the **Table** menu, point to **Maintenance** and click **Unlink DBMS Table**. The Unlink Table dialog box displays.
2. Choose the name of the table to be unlinked from the Unlink table list.
3. Choose **OK**. The specified table is unlinked.

Saving a DBMS Table

You save changes to an MapInfo Professional linked or live table the same way you save a regular MapInfo Professional table, with the Save Table command.

Saving a linked or live table results saves the records on the remote database. But before MapInfo Professional allows records from a linked or live table to be updated, it evaluates the records in a process called conflict resolution.

If MapInfo Professional finds conflicts between the data on the remote database and any records in the linked table since it was downloaded, the Resolve Conflicts dialog box automatically appears. Use this dialog box to resolve conflicts.

- For more information, see *Saving Changes Made to a DBMS Table* in the *Help System*.

Conflict Resolution for Linked or Live Tables

Because the records in a remote table are from a remote database, it is possible that other users may have changed or deleted them on the remote database since the table was downloaded into MapInfo Professional. As a result, conflicts may exist between the data residing on the remote database and the new data that you want to upload to the remote database.

When saving a remote table, if MapInfo Professional finds conflicts between the data on the remote database and any records in the remote table since it was downloaded, the Resolve Conflicts dialog box automatically displays. Use this dialog box to resolve conflicts as explained in the next table.

This process will be invoked whenever an attempt to save a remote table detects a conflict in an update. The dialog box allows the user to choose which fields from the conflicting records will be used to update the database. Three instances of the record being updated must be considered:

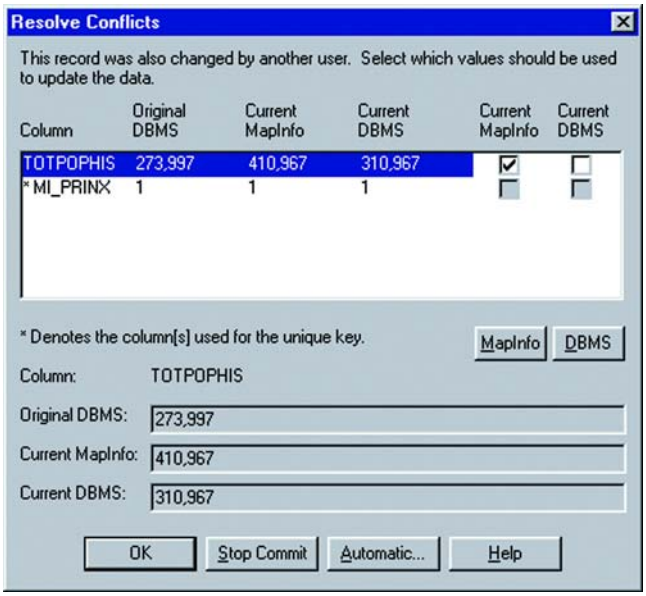
- The original server state of the record (the record as it appeared when initially extracted from the database).
- The current local state of the record (the record as it appears in the session of MapInfo Professional making the update, possibly after editing by the user).
- The current server state of the record (the record as it appears in the database at the time of the update).

A *conflict* exists when the original state of the record does not match the server state. This implies that another user has updated this database since it was extracted by MapInfo Professional.

The Conflict Resolution dialog box displays once for each conflicting record. At any point in this process, you may choose to leave this interactive mode and have the rest of the conflicts resolved automatically. In that case, you can use all local values or all server values to resolve the conflicts in the records.

For each conflict found during a commit, a modal dialog box displays. This box will display enough information for you to decide which data values to use to update the row in question.

Type of conflict	Default resolution
Value changed on server, local value *unchanged*	Use server value
Value changed on server, local value *changed*	Use local value



Click **OK** to save the selected values to update this record.

Column

Shows the name of the column in the record that has data which is in conflict and needs to be resolved. If the column name is too long and does not fit into the list box, a truncated representation will be shown instead. Its full value displays in the Column field.

Original DBMS

Shows the original data as it appeared when extracted from the database. If the original data is too long and does not fit into the list box, a truncated representation will be shown instead. Its full value can be displayed in the Original field.

Current MapInfo Professional

Shows the data as it appears in the MapInfo Professional linked table you are trying to save. The MapInfo Professional field will be blank if the record has been deleted from the MapInfo Professional database. If the data from the MapInfo Professional linked table is too long and does not fit into the list box, a truncated representation will be shown instead. Its full value can be displayed in the MapInfo Professional field.

Current DBMS

Shows data as it appears in the remote database at the time of the update. (This data might have been changed by another user since it was downloaded into an MapInfo Professional linked table.) The Current field will be blank if the record has been deleted on the remote database, after being downloaded into an MapInfo Professional linked table. If the current data from the remote database is too long and does not fit into the list box, a truncated representation will be shown instead. Its full value can be displayed in the Current field.

Current MapInfo Professional

Select this check box to update the remote database with the value from the MapInfo Professional linked table.

If the current record on the database or the MapInfo Professional record was deleted, then this check box is not available. Instead, you must use the **MapInfo Professional** or **Current** button.

Current DBMS

Select to retain the current value on the remote database. If the current record on the database or the MapInfo Professional record was deleted, then this check box is not available. Instead, you must use the **MapInfo Professional** or **Current** button.

MI Pro button

This button selects all the MapInfo Professional values. If the record you are trying to resolve was deleted from the MapInfo Professional database, selecting the **MI Pro** button will delete the record from the remote database. If the record you are trying to resolve was deleted from the remote database, selecting the **MI Pro** button will insert the new record into the remote database.

Current button

This button selects all the current DBMS values. If the record you are trying to resolve was deleted from the MapInfo Professional database, selecting the **Current** button will ignore the deletion and retain the current record in the remote database. If the record you are trying to resolve was deleted from the remote database, selecting the **MI Pro** button will insert the new record into the remote database.

Column

Shows the full name of the column highlighted in the list box.

Original DBMS

Shows the full value of the original data highlighted in the list box.

Current MI Pro

Shows the full value of the MapInfo Professional data highlighted in the list box.

Current DBMS

Shows the full value of the current remote database data highlighted in the list box.

Stop Commit

The **Stop Commit** button terminates the entire update. A second dialog box confirms that this is what you really want.

Automatic

The **Automatic** button causes the interactive conflict resolution to end. A dialog box displays to allow you to select the automatic conflict-resolution modes you want to use for the remainder of this update. You can select one two automatic modes from the dialog box. You can accept MapInfo Professional values, or the values currently residing on the remote database.

- For more information, see *Saving a Copy of a Table to a DBMS Table* in the *Help System*.

Disconnecting from a Remote Database

Disconnecting from a remote database server is a simple operation.

To disconnect from a remote database server:

1. From the DBMS Toolbar, do one of the following:
   - Click the **DBMS Disconnect** button.
   - On the **File** menu, click **Close DBMS Connection**.

   Both operations display the Close DBMS Connection dialog box. The **Connection** list displays all the open connections.
2. Select the connection(s) you want to close and click **OK**. The selected connection(s) close.

Understanding OCI and ODBC Connectivity Error Messages

You must have the OCI and ODBC support installed for MapInfo Professional to connect to remote databases. If you see the following messages, then you have installed the MapInfo DLLs for these features correctly but the drivers are missing:

OCI (Oracle Call Interface)

```
The MapInfo Oracle OCI Database driver (MIDLOCI.DLL) failed to load.
This is most commonly caused by not having an installation of Oracle's OCI
client, which is necessary for the MapInfo Oracle OCI Database driver to
load.
To fix this issue, please install the Oracle OCI Database driver or rerun
the MapInfo Professional Installer to remove the MapInfo Oracle OCI
Database client.
Clicking "OK" will allow you to run MapInfo Professional without the
ability to open Oracle tables through Oracle's Oracle Call Interface.
If you need more information, please contact MapInfo Technical Support.
```

ODBC (Open DataBase Connectivity)

```
The MapInfo ODBC Database driver (MIDLODBC.DLL) failed to load.
This is most commonly caused by an incomplete installation of MapInfo ODBC
Connectivity Support. To fix this issue, please rerun the MapInfo
Professional Installer to repair or remove the MapInfo ODBC Connectivity
Support.
Clicking "OK" will allow you to run MapInfo Professional without the
ability to open remote database tables through ODBC.
```

```
If you need more information, please contact MapInfo Technical Support.
```

A combined message displays if you attempt to add both of these options and neither of them have access to the appropriate database drivers.

Working with Styles in DBMS Tables

Using Per Row Styles for DBMS Table Layers

Per Row Styles allows the use of different object styles on a remote database. You can modify the styles of individual objects or groups of objects and save them to a DBMS table. To use Per Row Styles, the DBMS table must be set up correctly, and your MapInfo MapCatalog must have the appropriate structure:

- The MapCatalog must contain columns that support the use of styles. They are: RENDITIONTYPE, RENDITIONCOLUMN, and RENDITIONTABLE.
- The map table itself must have a character column wide enough to store the complete style string. Style strings vary in width. We recommend a minimum of 50 characters be provided. If you plan to use custom symbols, which use much longer strings, allow 200 characters.
- The entry for the table in the MapCatalog must be set correctly. This means that the RENDITIONTYPE is 1, and the RENDITIONCOLUMN contains the name of the column that will contain the style string. This entry is set by EasyLoader if the MapCatalog contains the new columns, or it may be set using the Make Table Mappable function.

Changing the Symbol Style in a Mappable DBMS Table

The Change DBMS Table Symbol command allows you to change the symbol attributes for the point objects in a mappable DBMS table.

1. On the **Table** menu, point to **Maintenance** and click **Change DBMS Table Symbol**. The Select DBMS Table is displayed. The dialog box only displays mappable DBMS tables.
2. Select a DBMS table to display the Change Table Object Style dialog box. Use the dialog box to specify new style attributes for the objects in the selected table.
3. You must close, reopen, and refresh the linked table for the style change to take effect.

Converting Unsupported Geometries in Oracle, Informix, and SQL Server

Some times when you are creating a Map in MapInfo Professional and you are storing the results in Oracle, Informix, or SQL Server, you create maps which use geometries that are not supported by these DBMS engines. Oracle does not support arcs, ellipses, rectangles, and rounded rectangles. Informix and SQL Server do not support arcs, ellipses, and rounded rectangles.

Note: If you have created a map you do not want to lose but cannot save to the DBMS of your choice due to unsupported geometries, you can use the Save As command and save the map without the unsupported geometries.

Oracle Geometry Conversion Behavior

If you try to save a map with unsupported spatial geometry types in Oracle, these are the results:

- **Spatial Geometry Types with All Unsupported Objects**: If you have created a map that might contain all of the unsupported objects and you are trying to save to Oracle, this message displays:

  ```
  Table has unsupported objects (rounded rectangles, rectangles,
  ellipses or arcs). Convert to regions and/or polylines?
  ```

  Click **Yes** to convert the unsupported objects to regions or polylines; you would select **No** to decline to convert the unsupported objects. If you decline, you cannot save the map you have created to the Oracle database. A confirmation message explains that the operation is canceled.
- **Spatial Geometry types with Region Objects Only**: If you have created a map that contains region objects only and you are trying to save to Oracle, this message displays:

  ```
  Table has unsupported objects (rounded rectangles, rectangles, or
  ellipses). Convert to regions?
  ```

  Click **Yes** to convert the unsupported objects to regions; you would select **No** to decline to convert the unsupported objects. If you decline, you cannot save the map you have created to the Oracle database.
- **For Spatial Geometry types with Line Objects Only:** If you have created a map that contains line objects only and you are trying to save to Oracle, this message displays:

  ```
  Arc is an unsupported object. Convert to polylines?
  ```

  Click **Yes** to convert the unsupported objects to polylines; you would select **No** to decline to convert the unsupported objects. If you decline, you cannot save the map you have created to the Oracle database.

Informix and SQL Server Geometry Conversion Behavior

If you try to save a map with unsupported spatial geometry types in Informix or SQL Server, these are the results:

- **Spatial Geometry Types with All Unsupported Objects**: If you have created a map that might contain all of the unsupported objects and you are trying to save to Informix or SQL Server, this message displays:

  ```
  Table has unsupported objects (rounded rectangles, ellipses or
  arcs). Convert to regions and/or polylines?
  ```

  Click **Yes** to convert the unsupported objects to regions or polylines; you would select **No** to decline to convert the unsupported objects. If you decline, you cannot save the map you have created to the Informix or SQL Server database.
- **Spatial Geometry types with Region Objects Only**: If you have created a map that contains region objects only and you are trying to save to Informix or SQL Server, this message displays:

  ```
  Table has unsupported objects (rounded rectangles or ellipses).
  Convert to regions?
  ```

Click **Yes** to convert the unsupported objects to regions; you would select **No** to decline to convert the unsupported objects. If you decline, you cannot save the map you have created to the Informix or SQL Server database.

- **For Spatial Geometry types with Line Objects Only:** If you have created a map that contains line objects only and you are trying to save to Informix or SQL Server, this message displays:

  ```
  Arc is an unsupported object. Convert to polylines?
  ```

  Click **Yes** to convert the unsupported objects to polylines; you would select **No** to decline to convert the unsupported objects. If you decline, you cannot save the map you have created to the Informix or SQL Server database.

Supporting Oracle Spatial

Oracle Spatial is an implementation of a spatial database from Oracle Corporation. You can install it in addition to the MapInfo Professional ODBC Connectivity component. Although it has some similarities to the previous Oracle SDO relational implementation, it is significantly different. Oracle Spatial maintains the Oracle SDO implementation via a relational schema. However, MapInfo Professional does not support the Oracle SDO relational schema via the Oracle Call Interface (OCI). MapInfo Professional does support simultaneous connections to Oracle Spatial through the OCI and to other databases through ODBC.

The Multipoint and Collection object types are translated into the Spatial Objects Oracle MULTIPOINT and COLLECTION, respectively, via Oracle OCI and vice versa. However, Oracle's COLLECTION object is broader in scope than MapInfo Professional's Collection, which only allows one REGION, one polyline and one multipoint. Therefore, conversion from MapInfo Professional object to Oracle objects and the conversion from Oracle objects to MapInfo Professional objects may not be a one-to-one translation.

The following table shows the relationship between MapInfo Professional objects and Oracle objects.

Oracle Spatial Objects	MapInfo Professional Objects
MULTIPOINT	Multipoint
COLLECTION	Collection
Point (cluster)	Multipoint
Line String	Polyline
Multiple Line String	
Polygon	REGION
Multiple Polygons	

The table indicates how Oracle Spatial objects are translated into MapInfo Professional objects. All point elements in an Oracle COLLECTION will be translated into one multipoint in a MapInfo Professional Collection; all Oracle Line objects (including single and multiple) will be translated into

one MapInfo Professional polyline; and all Oracle Polygons (including single and multiple) will be translated into one MapInfo Professional REGION. Therefore, when an Oracle COLLECTION is modified and then saved back into Oracle Server by using MapInfo Professional, the original structure of the Oracle COLLECTION object may be changed if it is more complicated than the MapInfo Professional Collection.

Oracle Spatial Requirements

To connect to Oracle Spatial within MapInfo Professional, you must have the Oracle Spatial or Oracle 9*i* and *9i* release 2, or 10G client installed. See your Oracle documentation for detailed information.

Primary Key used for New Table Creation or When Saving a Remote Copy

An Unique key ensures that an entry does not match any other entry from a different record. If a record does not contain any value, no error is reported. A Primary key requires that every record contains a unique value in that field. By making these values Primary keys, we enforce that every record has a value in this field.

Primary Key Auto-Increment for Oracle Databases

The Primary auto-increment feature manages the Primary key value for you. When you add a new record to a remote Oracle table, MapInfo Professional locks the table, checks for the highest value of the Primary key of the table, increments it by one (1), and then puts that value in the Primary key field. Informix and SQL Server users do not require this feature as the server-side software manages the Primary key automatically.

Use the Auto Key check box in the Open DBMS Table Option dialog box to enable this feature. When you select the Auto Key check box, the Primary key field is uneditable and the Unique key is automatically incremented. If you do not select this check box, the Primary key field remains editable, which supports backwards compatibility.

To access this feature:

1. From the **File** menu, click **Open** and select an Oracle database from the **Files of Type** drop-down list. Click **OK** to display the Open DBMS Table Options dialog box.
2. Select the **Auto Key** option to increment the Primary key of the selected table automatically for any new records.
3. Click **OK** to continue.

Oracle Object Map Verification Supporting Object/Map Validation

The Check Regions command enables you to remove region line segments that intersect each other. You can also think of this as nodes within a single polygon of a region where the polygon intersects itself, as when a node has more than 2 line segments emanating from it.

These cases can be broken down into two other instances.

- If a polygon has 2 looped sections, and the path traced by the nodes of the polygon follow a cursive figure 8 pattern, then we call this a *Figure 8 polygon*.

- If the same 2 looped polygon can trace its path as a cursive capital letter B, then we call this a *Bow Tie polygon*.

We think of Figure 8 as worse than Bow Tie because the area of a Figure 8 is always incorrect, while the area of a Bow Tie can be correct and accurate. Both Figure 8's and Bow Ties are detected.

Supporting SpatialWare

SpatialWare is a MapInfo Corporation product that helps users store, access, manage, and manipulate spatial data as a standard part of their business data. You can query both spatial and non-spatial data within a single SQL Server query using SpatialWare. All of the strengths of SQL Server as a relational database are extended to spatial data using SpatialWare. Spatial data may for example be directly managed and edited by many different users simultaneously.

Bound Objects in SpatialWare Spatial Queries

For both linked and live access tables, spatial objects in SpatialWare and Oracle Spatial queries are now submitted as a bound (binary) object. This change has been made for all implementations of SpatialWare: Oracle, Informix, and Oracle Spatial. Previously, a string was generated for the object. Because of the limitations on the string size, polygon complexity was also limited. Submitting spatial objects as bound objects removes this limitation. The string describing the spatial object will be stored in the .tab files and reconstructed into a bound object when the table is opened. The SW SPW lib will be used to construct the bound object from the SpatialWare string.

Creating Legends from/for a Live Table

You can retrieve unique styles from the table using the Create Legend wizard. You can retrieve styles from the map catalog, if performance is your primary concern, but if you prefer a more visually descriptive and appealing graphical representation of the unique map styles in your live table, you can create legends from a live table instead.

When are unique map styles available for a live table?

In general, remote databases have no consistent way of storing styles for geographic data. MapInfo Professional gives you two different ways of associating styles with geographic data for remote databases. The first way is to specify a common style for a database table in the map catalog, which is used for all records in that database table. The second way is to have an additional column for the database table that specifies a style for each record in that table. (MapInfo Professional uses the map catalog to keep track of the style column for a database table.) Unique map styles are available for a database table when it has this designated style column.

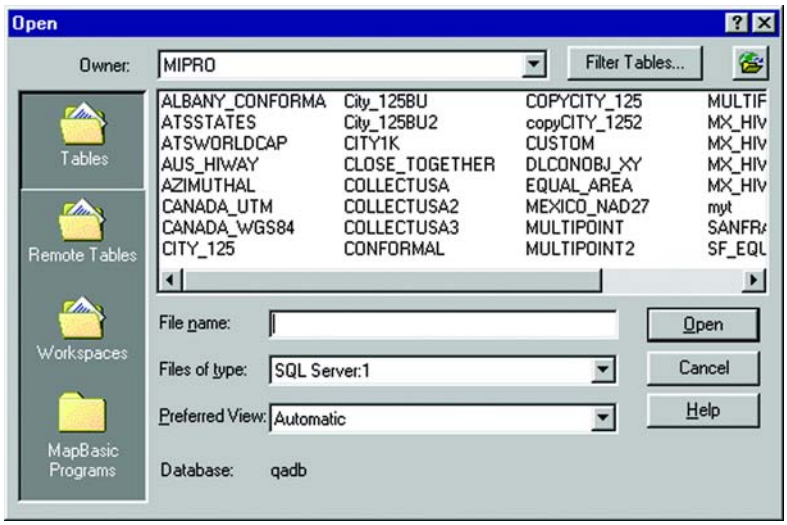
To see this functionality:

1. Open a remote DBMS connection and select a live table for display.
2. From the **Map** menu, click **Create Legend** to display the Create Legend Step 1 of 3 dialog box.
3. Select a layer to create a legend from and click **Next** to display the Create Legend Step 2 of 3 dialog box. For purposes of this demonstration, click **Next** to display the Create Legend Step 3 of 3 dialog box.

4. In the **Styles from** box, there are three options. The first option, **map catalog**, provides the existing support and is still the default for live tables.
   - Select **map catalog** to retrieve the default styles for the selected legend frame from the map catalog. Use this option when you are concerned with performance. Retrieving map styles from live tables on a remote database can take a long time, but retrieving a default style from the map catalog can be significantly faster. Remember that styles in the map catalog may not be as visually descriptive as the other options. This is the default option for live tables, but is disabled for other types of tables.
   - Select **Unique Map Styles** to retrieve all unique object styles for the live access table. MapInfo Professional retrieves all unique map styles from the database table for a more visually appealing legend. For extremely large tables, this option can take longer than the first option. This option is selected by default when the legend frame is not a live access table.
   - Select **Unique Values in a Column of the Selected Table** to retrieve the styles associated with the values saved in a particular column in the database table for a more visually appealing legend. For extremely large tables, this option can take longer than the first option.
5. Then click the **Save Frame Setting to Metadata** check box to preserve the choice you made in this dialog box. When you re-open this dialog box the settings from the metadata are used as default values instead of the system set default values. There is legend metadata for the **Styles from** radio buttons that we preserve.
   - **File Data Source** — Displays all file DSNs (data source names) and subdirectories contained within the directory displayed in the Look In box. Double-clicking a DSN connects to the data source.
   - **Look In** — Displays the current directory in which the subdirectories and file DSNs display. Click the **Down Arrow** to the right of the text box to display the entire path.
   - **DSN Name** — Displays the file DSN name selected in the File Data Sources list, or you can enter a new file DSN name.
   - **New** — Adds a new file data source. If you click this button, the Create New Data Source dialog box appears with a list of drivers. Choose the driver for which you are adding a file DSN. After you click **Next**, you may specify the keywords for the file DSN. See **Opening a Connection to an ODBC Data Source on page 253**, for instructions on creating a new data source.
6. If your connection type is **Oracle Spatial**, the MapInfo Professional Oracle Connect dialog box displays.

7. Enter the server name, user name, and password, and then click **OK**.

   When you have chosen or created a connection the Open DBMS dialog box displays. It contains a list of tables for that connection, which displays in the Tables field. The directory path of the database connection or the database name also displays. This field is not present for data sources that do not provide this information.



8. Click the name of the table you want to download to highlight it.
9. As an optional step, use the **Filter** button to select which types of tables to list. The default shows Tables, View, and Synonyms, and hides System tables.
10. Click **Open**. The Open DBMS Table Options dialog box displays.

    For data sources that make use of owners, such as Oracle, the Owner field is activated. It allows you to list tables owned by different users.

- See *Troubleshooting DBMS Table Issues* in the *Help System*.

8

Drawing and Editing Objects

The drawing and editing capabilities in MapInfo Professional® allow you to create and customize an unlimited variety of objects for your maps. Easy-to-use drawing tools and commands are accessible from the Drawing Toolbar. You can also display nodes, line directions and centroids to give you better control when editing objects.

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- Drawing Symbols 284
- Working with Text on the Map 287
- Editing Objects 288

Understanding the Drawing and Editing Tools

MapInfo Professional has a complete set of drawing tools and editing commands. These tools allow you to draw and modify objects on your map. You can also use these tools to customize the colors, fill patterns, line types, symbols, and text on your map.

However, these tools and commands give you more than the ability to modify your map. You can draw a variety of objects that you can use to perform powerful geographic analyses. For example, you can draw circles, polygons, and other bounded objects. You can then search for records within those boundaries.

Note: You can only draw and edit objects on a map when the layer the object is on is editable.

We have covered making a layer editable in depth elsewhere in this User Guide. See **Making the Layers "Editable" on page 167**.

Note: We have increased the size of the allowed objects in MapInfo Professional. That is, we have increased the number of nodes permitted per object for regions, polylines, and multipoints and we have increased the number of polygons allowed in a multipolygon region and increase the number of polylines in a multiple segment polyline.

- For more general information, see *Understanding the Drawing and Editing Tools* in the *Help System*.

Using the Drawing and Editing Commands

There are nine drawing tools, each located in the Drawing toolbar, which you can review in **Reviewing the Drawing Toolbar on page 157**. The Drawing toolbar contains six additional buttons to aid you in drawing and editing.

Icon	Tool Button	Description
	Reshape	Toggle in and out of Reshape mode with this button when you want to add, delete, or move nodes in an editable layer (also available on the Edit menu).
	Add Node	The **Add Node** button allows you to put additional nodes on an object for more precise editing.
	Line Style	Displays the Line Style dialog box where you can change the color, width, and type of selected line objects or set new defaults for future objects.
	Region Style	Displays the Region Style dialog box where you can change the fill pattern and border of selected region objects or set new defaults for future objects.

Icon	Tool Button	Description
	Symbol Style	Displays the Symbol Style dialog box where you can change the symbol type, color, and size of selected objects or set new defaults for future objects.
	Text Style	Displays the Text Style dialog box where you can change the font, size, color, and attributes of selected text or set new defaults for future text and labels.

Adding a Node

Nodes can be added only to lines, polylines, and regions.

The maximum number of nodes for regions and polylines is 1,048,572 nodes for a single polygon region or polyline. The limit drops by seven nodes for every two additional polygons.

To add a node :

1. Choose **Drawing Toolbar > Add Node** button.
2. Move the cursor to the point on the segment where you want to add a node.
3. Click to add the node. Press the **Backspace** key to delete the last node added.
4. Choose **Edit > New Row**, a new row is added to the bottom of the table.

Adding Nodes to an Object (Overlay Nodes Command)

To add nodes to an existing object:

1. Select one or more objects in the editable map layer of the active Map window. These are the objects to which you want to add nodes.
2. Choose **Objects > Set Target**. The objects you selected in Step 1 appear in a different style to indicate that they are the editing targets.
3. Select one or more objects from any layer of the active Map window. Presumably, these are objects that intersect your target object(s).
4. Choose **Objects > Overlay Nodes**.

MapInfo Professional adds nodes, if appropriate, to the target object(s).

When you choose **Overlay Nodes**, MapInfo Professional adds nodes to the current target objects. MapInfo Professional calculates all points where the target objects intersect the currently selected objects; MapInfo Professional then adds nodes to the target objects at the points of intersection unless the target objects already have nodes at those locations. If the target objects do not intersect the selected objects, MapInfo Professional does not add any nodes.

If you use **Overlay Nodes** to add nodes to a line, MapInfo Professional converts the line to a polyline. If you use **Overlay Nodes** to add nodes to an ellipse, rectangle or rounded rectangle object, MapInfo Professional converts the object to a region. **Overlay Nodes** does not affect text or point objects, and you may not use point or text objects to add nodes to other objects.

Drawing Objects

Drawing objects in MapInfo Professional is easy. Once you have made the layer editable, choose the appropriate tool. Using the shape tools, you can draw arcs, ellipses, circles, lines, rectangles, and rounded rectangles on your map. You can either draw the object directly on the Cosmetic Layer (and save it to another or new layer later) or make a map layer editable and draw the objects there.

Once you have drawn the object, you can move the object, delete it, copy it to the Clipboard, or paste it to another Map window.

Also, you can delete the last node of the object by pressing the **Backspace** key. If there is only one node left in the object, it will not be deleted.

Specifying an Object's Geographic Attributes

If the selected object is editable (resides in an editable layer) then you can specify attributes for the object by accessing that Objects Attributes dialog box.

Note: If the object is not editable then you can only access a read-only dialog box.

To specify an object's geographical attributes:

1. Choose **Map > Layer Control**. The Layer Control dialog box displays.
2. Select the layer containing the map object.
3. Check the **Editable** box.
4. Click **OK**.
5. Select the map object.
6. Do one of the following:
   - Choose **Edit > Get Info**.
   - Double-click the map object with the **Select** tool.

   The Object Attributes dialog box displays.
7. Type in attributes as appropriate.
8. Click **OK**.

Use the Help search option to locate information for a specific map object (for example, Arcs, Points, Polygons etc.).

Reverting to a Previous Version

Use Revert Table in the File menu to access a previous version of a table when you have made changes that you do not want to make permanent and haven't saved yet. Revert Table replaces the selected table currently in memory with the last version saved.

To revert to a previous version:

1. Choose **File > Revert Table** to display the Revert Table dialog box. Here you can choose the table to revert to (that is, return to its previous state).
2. Once you have chosen a table to revert, MapInfo Professional prompts you on whether you wish to discard the changes you have made in the table.
3. Click **Discard**. MapInfo Professional discards the changes you have made to the table. However, if you have second thoughts, click **Cancel**.

- For instructions on drawing specific objects such as lines, polylines, squares, etc, see *Drawing Objects* in the *Help System*.

Using the Ruler Window as You Draw

The Ruler window will show the distance of line segments as you draw, as well as the cumulative distance of the drawn object. If necessary, a rubber-banding line displays to show what points are being used to computer the distance. The Ruler window also displays what type of calculation is used to compute the distance: Spherical or Cartesian. The type of calculation depends on the projection of the map.

The following drawing tools will display a rubber-banding line:

- Arc
- Ellipse
- Rectangle
- Rounded Rectangle

You can also use the Ruler window with the Marquee Select and Radius Select tools. Just click the Ruler tool to display the Ruler window.

If the Ruler window is not active, the drawing and selection tools noted above do not display distance. The rubber-banding line does not display.

- For more instructions, see the *Measuring the Distance between Two Points* topic in the *Help System*.

Object Styles

MapInfo Professional draws objects using the default color, fill pattern, line type, symbol, and text settings for the layer you are drawing on. The default style can be set in the Styles Preferences dialog box.

To change the style of an *existing* object:

1. On the **Map** menu, click **Layer Control** and make the layer editable.
2. Select the object and choose the appropriate style command from the **Options** menu.

   The style commands are also available on the **Drawing** Toolbar. These commands also set the styles for any subsequent objects to be drawn on the layer.
3. Save your changes.

For closed shapes such as circles and squares, you can change the fill pattern and color, the style and color of the border, and the line width of the border. For arcs and lines, you can change the type of line, its color, and the width of the line. In addition, you can use interleaved line styles to create the appearance of intersections for overlapping intersections and lines within a single layer. Interleaved line styles are available for use with lines of the same style and color (they can be different widths). Interleaved line styles are not available for solid lines or borders.

Any edits to an object's default settings will be applied during the entire work session until you make new changes. To save the settings, you must save the table where the object resides.

You can also change the display of an object in Layer Control. In the Layer Control dialog box, click the **Display** button to bring up the Display Options dialog box. Click the **Style Override** check box to activate the **Style Override** button. Click the **Style** button to bring up the appropriate style dialog box.

Note: The settings you specify through the Display Options dialog box are temporary unless you save the table to a workspace.

- For more information, see *Using Interleaved Line Styles* in the *Help System*.

Printing Fill Patterns

When it comes to printing objects, some fill patterns print faster than others. In general, the fill patterns on the top row of the pattern list in the **Pattern** drop-down list print the fastest. The difference in printing speed varies from printer to printer. The fill patterns on the top row are also the ones most likely to plot correctly on pen plotters, although results depend on which plotter driver you use. For more coaching on printing fill patterns, review the *MapInfo Professional Printer Guide,* which is located in the Documentation subfolder of your installation directory. To review the list of fill patterns available in the MapInfo Professional product, see *Fill Patterns Used in MapInfo Professional* in the MapInfo Professional *Help System*.

Drawing Polygons and Polylines

Drawing polygons is different than drawing other shapes because you are creating a region on which you can perform other editing and analysis.

For instance, you want to create school districts for your map. You have a street map of your town to guide you in defining the school district boundaries.

To create a polygon:

1. Choose the **Polygon** tool. The tool becomes a cross hair.
2. Click a starting point for the polygon.
3. Continue to click to add segments to the polygon.
4. When you are ready to complete the object, double-click the last end point.

   You can delete the last node by pressing the **Backspace** key.

   Note: If there is only one node left in the object it will not be deleted.

You can then use the Combine command to combine this region with another, reshape the region, etc.

Polylines are made up of multiple line segments that are treated as one object. Unlike lines created with the Line tool, you can smooth polylines into a continuous curve using the Smooth command. Again, you can delete the last node by pressing the **Backspace** key.

Note: If there is only one node left in the object it will not be deleted.

Drawing Orthogonal Polygons

You can draw orthogonal (right angle) polygon line segments when you press the **Ctrl** key. Using this key you can draw the polygon at 45 degree increments relative to the slope of the last line segment. This functionality works for Add Line, Add Polyline, the Ruler Tool, Custom Polyline and Custom Polygon tools, and the Add Polygon operations.

This functionality is useful when you want to draw perpendicular lines at an angle rather than horizontal to the map.

Note: Snap and Autotrace functionality must be turned off to use this feature, because when these features are activated, the **Ctrl** and **Shift** keys have other purposes. The **Shift** and **Ctrl** keys also do not operate when you are using the **Polygon Select** tool.

To see this functionality:

1. From the **File** menu, click **Open** and select a map to display.
2. Make a layer editable using the Layer Control dialog box.
3. Select the **Polygon** tool from the **Drawing** toolbar.

Note: This works with any of the Line, Polyline, the Ruler Tool, Custom Polyline and Custom Polygon tools as well, we are just using the Polygon tool as an example.

4. Click and draw a single line in any direction other than horizontal following these directions:
   - To draw the next segment perpendicular to the last segment, press **Ctrl** while dragging the cursor.
   - To draw the next segment perpendicular to horizontal, press **Shift** while dragging the cursor.

Tracing Polylines and Polygons

When you are drawing a new polyline or polygon, you can use **Autotrace** to trace nodes from existing polylines or polygons. The Autotrace tool is only in effect when you are using a polygeometric tool (Add Polyline, Add Polygon, or Select Polygon) and Snap is on.

To trace the nodes of an existing polyline or polygon:

1. Press the **S** key to activate Snap Mode.
2. Press the **T** key to activate Autotrace.
3. Click on the first node of the polyline/polygon you want to trace.
4. Move the mouse to another node of the same object. Follow the procedure below for the type of object you are tracing:
   - **Polyline**: Hold down the **Shift** key or the **Ctrl** key and click.
   - **Polygon**: Hold down the **Shift** key for the shorter set of nodes or the **Ctrl** key for the longer set of nodes and click.

   Pressing the **Shift** or **Ctrl** keys highlights the trace path. Click to automatically trace the segments between the nodes and add them to the polyline/polygon you are drawing.
5. Continue until you have traced the entire polygon/polyline and right-click to end.

Note: Autotrace only one object at a time; clicking nodes in different objects will produce a straight line between the two nodes.

Converting a Polyline to a Region

To convert a polyline into a region:

1. Make the Map window active.
2. Open **Layer Control** and make the layer that contains the polyline editable.
3. Select the polylines you want to convert to a region.
4. On the **Objects** menu, click **Enclose**. The Create Region Objects From Enclosed Areas dialog box displays.
5. Click **OK** to convert the polyline you selected to a region.

You can also convert regions to polylines. For these instructions, see **Converting Regions to Polylines on page 298**.

Splitting Polylines at Nodes

A single-section polyline can be split into two polylines at a selected node.

To split a single-section polyline:

1. From an editable layer, select a single-section polyline
2. Click the **Reshape** button from the Drawing tools.
3. Select one node (other than the first or last node).
4. Select the **Objects** menu, then **Polyline Split at Node**
5. If a layer is not a cosmetic layer or if the polyline is in the Layout window, the Data Disaggregation dialog box will appear. Here the user can specify how data is disaggregated.
6. After selecting the data disaggregation method, click **OK**. The selected polyline will be split at the node into two polylines.

Error messages display under the following conditions:

- You did not select a node of the polyline.
- You selected a beginning or ending node of the polyline.
- You selected more than one node of the polyline.
- The object that you selected is not a polyline object.
- You attempted to split a multi-segmented polyline (only single-section polylines can be split).

Notice the difference in the way the angle draws between the **Ctrl** and **Shift** created polygons in the next figure.

Converting Objects into Polyline Objects

If a region contains lakes or islands, and you convert that region to a polyline, the polyline has multiple sections. Each lake or island comprises one section of the polyline. When you convert a circle or ellipse into a polyline, the polyline contains 102 nodes. When you convert an arc into an ellipse, the number of nodes depends on the starting and ending angle of the arc. If the arc spans 180 degrees (for example, the starting angle is zero and the ending angle is 180), a polyline based on the arc will contain 52 nodes; if the arc spans 90 degrees, a polyline based on the arc will contain 26 nodes; etc.

The *Help System* contains these related topics:

- *Displaying Distance while Drawing Objects*
- *Displaying Distance, Length, Perimeter, and Area Calculations*
- *Specifying Distance, Length, Perimeter, and Area Calculations for a Particular Map*

Drawing Symbols

Symbols on your maps make your map more expressive and easier to understand. This section explains how to change a style currently used by MapInfo Professional and create your own custom symbols. We also discuss in detail the rules governing symbols.

To draw symbols, make the layer you want to draw the symbols to editable and choose the **Symbol** tool. Place the cursor where you want the symbol to be and click. The symbol displays using the default symbol style settings.

The *Help System* contains these related topics:

- *Adding Point Symbols to your Map*
- *Specifying Symbol Styles of Point Objects*
- *Changing the Location of Point Symbols*

Changing a Symbol Style on a Map

To change a symbol's style on a map:

1. Select the symbol with an appropriate selection tool.
2. Do one of the following:
   - Click the **Symbol Style** button
   - On the **Options** menu, click **Symbol Style**

   Using either method, the Symbol Style dialog box displays.

   Note: The options in the Symbol Style dialog box may be different depending upon the size and complexity of the image.

   Here you can change the symbol, font, color, and size, as well as create background effects and bold face for symbols.

   Select the **Display at Actual Size** check box to see the symbol you selected at the size it was originally created.

   Click the **Reload** button to refresh the list of custom symbols stored in the Application Data CUSTSYMB directory. Select this button if you added a new custom symbol and do not see the symbol(s) in the list.

   Click the **Full View** button to display the entire view of custom symbol in a separate window. This button displays only when you select the Custom Symbols font type. You use this button when the preview is too large to display completely in the sample area.
3. Make the desired changes, and click **OK**.

   The symbol displays with the style changes you specified. These settings also apply to any subsequent symbols you draw until you change the settings.

Supported Fonts for Symbols

You have many options when drawing symbols. We support a number of TrueType fonts that carry their own symbol sets. We have also organized a number of symbol fonts around different industries, such as real estate and transportation, making it easy for you to find the symbols you need. MapInfo Professional supports the following fonts:

- MapInfo Cartographic
- MapInfo Transportation
- MapInfo Real Estate
- MapInfo Miscellaneous
- MapInfo 3.0 Compatible Symbols (vector symbols, available as a True Type font in MapInfo Professional): the 36 shapes from the MapInfo symbol set
- MapInfo Oil & Gas
- MapInfo Weather
- MapInfo Arrows
- Installed font symbols: symbols available from the installed fonts that offer a symbol set
- Custom symbols: from here you can access user-created bitmap symbols which you have saved to the CUSTSYMB directory. This directory is created during MapInfo Professional installation. See **Working with Custom Symbols (page 285)** for more about this process.

The MapInfo Symbols font is a TrueType font. When you use these symbols, the Background and Effects options in the Symbol Style dialog box are unavailable.

Working with Custom Symbols

You can create and use your own custom bitmaps as symbols in MapInfo Professional. To access these custom symbols, place them in the CUSTSYMB directory and select them from the Custom Symbols option in the Font list of the Symbol Style dialog box (**Options > Symbol Style)**. All of the custom symbols in MapInfo Professional are stored in the CUSTSYMB directory. If you cannot find this directory, there are a couple of places you could check. The location of this file depends largely on the administration of your computer, the version of MapInfo Professional you use, and the location of your installation directory.

Usually, this directory is located in Program Files\MapInfo\Professional\ (or one of its subdirectories) or in \Documents and Settings\user's login directory\Applications Data\MapInfo\MapInfo\version number\. If you cannot find this directory, click **Start** and **Search** and search for \CUSTSYMB on your system.

Note: If you add custom symbols while you are working in MapInfo Professional, open the Symbol Style dialog box and click the **Reload** button to ensure that the new symbol(s) you have added display. Otherwise, you have to exit MapInfo Professional and re-enter it to get the new symbols to display in the Custom Symbols list.

When you change the style of a custom symbol, the Effects options in the Symbol Style dialog box change. You can either show a background or apply a color.

- **Show Background** displays the custom symbol with the background color with which it was created.
- **Apply Color** replaces all non-white pixels with a color you choose from the color palette.
- **Display at Actual Size** shows the symbol at its actual size.

When you are creating extended custom symbols we recommend you check the **Show Background** check box if you do not require transparency. This setting improves performance significantly during exporting and Drag and Drop operations.

MapInfo Professional ships with custom symbols that you can use to enhance your maps.

The *Help System* contains the following related topics:

- *Understanding the Custom Symbol Types*
- *Understanding the Custom Symbol Sizes, Shape, and Color Rules*
- *Adding User-Defined Custom Symbols*

Creating a Custom Symbol

To create a custom symbol:

1. Create your own custom symbol and save it as a bitmap.
2. Place the bitmap in the directory you have assigned for symbols.
3. Restart MapInfo Professional if it is running.
4. Open your map and choose **Map > Layer Control** to display the Layer Control dialog box.
5. Make the map layer where you want to place the symbol editable.
6. Choose **Options > Symbol Style** to display the Symbol Style dialog box.
7. Click the **Font** drop-down menu and choose **Custom Symbols**.
8. You must click the **Reload** button to view the newly added custom symbol.
9. Select your custom symbol and choose **OK**.
10. Click on the map using the **Symbol** tool to display your custom symbol.

Note: The bitmap file has to be 256 color and under 128k in size. Bitmaps should also be the same dimension in x and y.

- For more information, see *Finding the Custom Symbol Directory* in the *Help System*.

Displaying Overlapping Symbols

When point objects display at the same coordinate, you can miss the significance of their proximity because the data overlaps each other, preventing you from making the connection.

The Dispersed Groups symbol font gives you a way to display symbols that represent different organizations, events, or services that occupy the same coordinate location without overlapping each other. When you zoom out from the coordinate point, these symbols display around the coordinate point side by side. This font is installed when you install MapInfo Professional.

This symbol style is useful in several industries:

- *Crime mapping*: See multiple incidents at the same address and for traffic incident analysis
- *Insurance*: See multiple policy holders, policies, claims, or inspection requirements at the same address
- *Wireless telecom*: See multiple assets on the same mast/tower
- *Health care*: See multiple incidents at the same address
- *Retail*: See multiple attributes of a retail store, for example what internal franchised departments it contains or specific services that it offers.

- For specific instructions, see *Displaying Overlapping Symbols* in the *Help System*.

Working with Text on the Map

Although the labeling feature takes care of most of your text needs, you will still need to create text objects with the Text tool to annotate your map or layout (for example, map titles and subtitles). Unlike labels, text objects have no connection to data.

To create text, make sure the layer you want to draw the text to is editable and choose the **Text** tool. The cursor changes to an I-beam. Place the cursor where you want the text to be and type in the text you want.

To enter text onto a map:

1. Click the **Text** button in the **Drawing** toolbar. The cursor turns into an I-beam when moved over the active window.
2. Click the cursor at the place on the map, layout, or data displayed in the Browser window where you want to enter the text. A blinking cursor appears. In a Browser, press **Tab** to move to the next cell.
3. Type the desired text. The text will appear at the blinking cursor as you type.
4. When you want to move to a new line of text press **Enter**.
5. When you are finished entering text, press **Esc** or click the **Select** button in the **Main** toolbar and click the mouse somewhere else on the Map or Layout.

Note: The font used is the current font, as indicated in **Options > Text Style**.

To change the style of the text:

1. Select the text with the **Select** tool.
2. Do one of the following:
   - Click the **Text Style** button in the **Drawing** toolbar
   - Choose **Options** > **Text Style**

   Using either method, the Text Style dialog box displays where you can change the font, the size, color and create various effects such as haloing or drop shadows.

   These settings will remain in effect for any text you subsequently draw on the map until you change them.
3. To save changes, on the **File** menu, click **Save**. To save objects drawn to the Cosmetic Layer, on the **Map** menu, click **Save Cosmetic Objects**.

Editing Objects

In all likelihood, you will need to change or edit some of the objects you have drawn or mapped. To begin this process, you need to make the layer that you want to change editable (on the **Map** menu, click **Layer Control**).

To edit an object:

1. Select the object with the **Select** tool.

   If the object is a line, edit handles appear at either endpoint.

   If the object is a boundary or region, edit handles appear at the outer corners of the object.
2. Drag the object to a new position or change its line style, fill pattern, or symbol.
3. On the **File** menu, click **Save** to save your changes.

To delete an object:

1. Click the object with the **Select** tool.
2. Do one of the following:
   - On the **Edit** menu, click **Clear** or on the **Edit** menu, click **Cut**.
   - Press the **Delete** key.

   Using either method, MapInfo Professional deletes the object. To view an object's nodes, centroids, and line direction when editing and drawing, set the conditions in the (Layer Control) Display Options dialog box.

Positioning and Sizing your Map Objects

To move an object to a new location, make the object's layer editable and click the object to select it. Hold down the mouse button for at least one second until the cursor turns into a four-headed arrow. Drag the object to its new location and release the button. The object maintains its shape.

To move an object (in an editable layer) one pixel at a time, click it and press and hold the **Ctrl** key and press the **Arrow** button corresponding to the direction you want the object to move. To move the object 10 pixels at a time, press and hold the **Ctrl** and **Shift** keys and press the **Arrow** button corresponding to the direction you want the object to move.

Also, if you click the on the fifth edit handle (rotate handle) and hold down the mouse button, you can rotate the highlighted box to the desired angle. A rubber banding box is drawn representing the bounds of the rotated object. If you press and hold **Shift** key while the rubber banding box is being drawn, the rotation will be limited to 45 degree increments.

Moving Objects on the Map

You can move selected objects within its editable map layer easily.

To move an object on the map:

1. Click your map to make it active.
2. Make the layer where the object is located editable (on the **Map** menu, click **Layer Control**).
3. Select the object(s) using the **Select** tool.

   If you select more than one object at a time to move, the objects move in the same way. Take care to ensure that you do not move an object off the map or off land by mistake.

   Note: When you move the objects, you move them all at once, maintaining their positions relative to one another.
4. Do one or all of the following:
   - To move the selected object(s) using the mouse, hold down the mouse button and drag the object to its new location
   - To move the selected object(s) one screen pixel at a time, press and hold the **Ctrl** key and press the **Arrow** key in the direction you want the object(s) to move
   - To move the selected object(s) 10 screen pixels at a time, press and hold the **Ctrl** and **Shift** keys and press the **Arrow** key in the direction you want the object(s) to move

   Note: Since the moves are made in screen pixels, the zoom level affects how far the object is moved.

Offsetting Objects on the Map

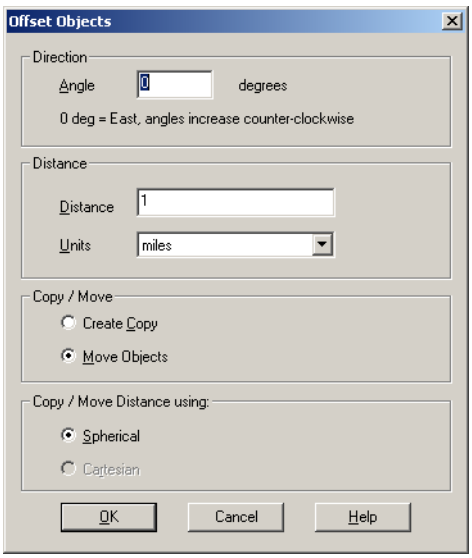
The Offset feature makes a copy of the object(s) you select from the original source object(s) and saves them in the original data file.

You can both move and offset the objects you select using this process. The difference between these two operations is whether MapInfo Professional makes a copy of the data (as in the case of copy) or simply moves the objects and stores the new value in the original table.

To move/offset selected objects on the map:

1. Click your map to make it active.
2. Make sure a layer is editable (on the **Map** menu, click **Layer Control**).

   The offset/move functionality is available when any layer is editable, not just when the objects you want to move or offset are in the editable layer. However, you can only move an object within its editable layer. Copy is always permitted as long as a layer is editable.
3. Select the object(s) using the Select tool.
4. On the **Objects** menu, click **Offset** to display the Offset Objects dialog box.



5. To move your selected objects, enter or select from the following options and click **OK** to apply the changes. To copy your selected objects to offset them, enter or select from the following options and click **Next**. Then go to **step 6**.

   - **Angle** — To offset your selected object at an angle, type the angle (in degrees) in this field. The new object is created based on the original object and is offset in the direction of the angle you specified, measured from the positive X-axis. If you enter a positive angle, the object is offset counterclockwise; if you enter a negative angle, the object is offset clockwise.
   - **Distance/Units** — To set the offset distance and units, type the distance and select the units in the Distance box. The list of units is as follows: inches, links, feet, U.S. Survey feet, yards, rods, chains, miles, nautical miles, millimeters, centimeters, meters, and kilometers.

   Note: MapInfo Professional takes the default units from the map window in which you've selected the object.

   - **Create Copy** — Click this option to create a copy of the selected object(s) in the data. When you complete this process, MapInfo Professional saves the copy to the editable layer.
   - **Move Objects** — Click this option to move the object without creating a copy in the data. You can only move an object within its own editable layer. When you move objects, the Data Aggregation dialog box does not display, since you are only moving the data within the layer.

- **Copy or Move Distance Using** — The option you select in this box depends largely upon the projection of your source map. If your map has a latitude/longitude projection, MapInfo Professional enables the **Spherical** type only. If you are working with a non-Earth projection, MapInfo Professional enables the **Cartesian** type only.

  When you click **Spherical**, MapInfo Professional calculates the copy/move distance by mapping the data into a Latitude/Longitude On Earth projection.

  When you click **Cartesian**, MapInfo Professional calculates the copy/move distance by considering the data to be projected to a flat surface and distances are measured using Cartesian distance calculations.

6. The Data Aggregation dialog box displays if one of these conditions are true:
   - You clicked the **Create Copy** option
   - You selected objects in a different table from the table associated with the editable layer
   - The editable layer is not the cosmetic layer and has no text associated with the geographical objects in it

   You may notice that the only controls available to you in this dialog box are **Blank**, **Value**, and **No Data**.

   Type a value you will remember in the **Value** field of this dialog box. For more information about data aggregation, see **Aggregating and Disaggregating Data in Chapter 11 on page 387**.

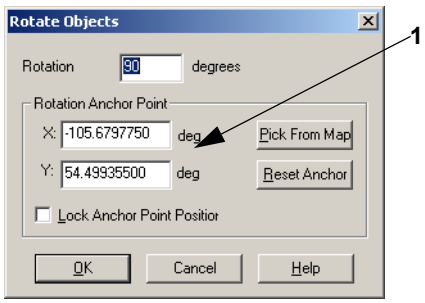
7. Click **OK** to copy the data and offset the objects you selected.

Rotating Objects on the Map

To rotate an object or objects by a specific angle, use the Rotate Objects tool, which is available whenever you have selected an object(s) in an editable layer in a Map or Layout window.

To rotate an object or objects in a Map or Layout window:

1. On your editable layer, select the object(s) you want to rotate.
2. On the **Objects** menu, click **Rotate** to display the Rotate Objects dialog box.



3. In this dialog box, you specify the angle and the anchor point of the rotation. Type the rotation angle in the Rotation field.

Note: The rotation angle can be positive (counter clockwise) or negative (clockwise).

4. Determine the anchor point by doing one of the following:
   - Accept the default anchor point of the selected object(s) by leaving the X and Y coordinates that display in these field as they are

   Note: The default anchor point varies depending upon how many objects you have selected and the kind of objects they are. See **Understanding an Object's Default Anchor Point on page 292** for more about default anchor points.

   - Type new entries in the X and Y coordinate fields to select a new anchor point
   - Click the **Pick from Map** button and click the anchor point you want on the Map or Layout window. Click the mouse button only once to establish this point.

   Note: When the **Pick from Map** button is disabled, you can select locations directly from the open map. If a map is not open, you can select another tool (like the **Select** tool) and use that tool instead of the **Pick from Map** functionality.

   To return to the default anchor point, click the **Reset Anchor** button.

5. Decide whether or not you want to lock the anchor point. Click the **Lock Anchor Point Position** check box to lock the anchor point.

   When you lock the anchor point, you ensure that the anchor point will not be recalculated when you return to the Map or Layout window. If you do not lock the anchor point, MapInfo Professional recalculates the anchor point in the based on the rotated selection. Once the objects are rotated, they may have a different anchor point.

   Note: You cannot maintain an anchor point lock when you change the selection from the Map window to the Layout window or from the Layout to the Map window.

6. When you have completed these entries or selections, click **OK** to rotate your object(s).

Understanding an Object's Default Anchor Point

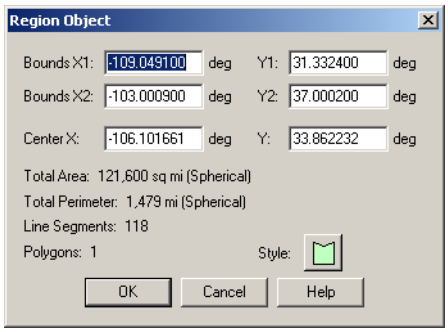
When rotating objects in an editable layer, the default anchor varies depending upon how many objects you are rotating and the kind of objects you select. If you select:

- A single object (not a polyline), the default anchor point is the object's centroid
- A single polyline or several objects, the default anchor point is the center of the polyline's or the selected objects minimum bounding rectangle (MBR)
- Multiple objects, the default anchor point is the center of the MBR of the selected objects

Changing your Map Object Attributes

When you double-click a region, line, point or text object with the Select tool, MapInfo Professional displays an Object Attribute dialog box. This dialog box gives you the object's size, its position, and other information specific to the object.

For example, if you double-click a region, MapInfo Professional displays the perimeter, centroid, and area. It also shows the type of distance calculation that was used to obtain these values.



If the layer is Selectable but not editable, you can only view these attributes. If the layer is also editable, then you can change these attributes by typing new values into the text boxes of the dialog box. The illustration above shows the Object Attribute dialog box for a region object in an editable layer. You can also access this dialog box on the **Edit** menu (click **Get Info**).

Changing an object's size and position with the Object Attribute dialog box gives you much greater control over its exact size and position than you have through drawing it on the screen. For example, you have a list of ten radio towers and their X and Y coordinates. You could geocode these points using the Create Points command. However, if you bring up the Points Object Attribute dialog box and type the new X and Y coordinates, you can create ten points with the Symbol tool and then individually place them in the correct location.

You can also use the Text Object Attribute dialog box to change the point's actual text. For example, you have typed the title "World Population" on a Map window. You want to fix your typographical error. Bring up the Object Attribute dialog box for the text object. You can correct your error in the box that displays the text.

- For more information, see C*hanging Attributes for Multiple Layers* in the *Help System*.

Reshaping Map Objects

You can reshape regions, polylines, lines, arcs and points. A region is an object created with the Polygon tool. You cannot reshape objects created with the Rectangle tool, the Rounded Rectangle tool, or the Ellipse tool.

To reshape an object:

1. Select an object with the Select tool.
2. Do one of the following:
   - On the **Edit** menu, click **Reshape**
   - Use the **Reshape** button on the **Drawing** toolbar.

   You are now in Reshape mode. MapInfo Professional draws nodes at every juncture where two polyline or polygon line segments meet.

3. To reshape the object, move the nodes, add nodes, or delete nodes from the object.

   To move a node, click it and, while holding down the mouse button, drag the node to the desired location. The line segments connected to the node are moved to a new position.

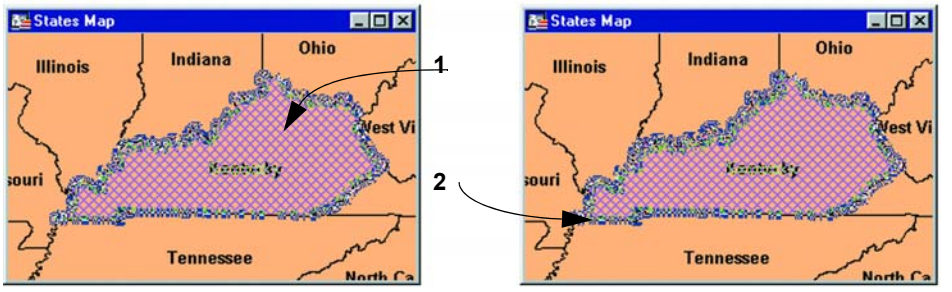
   To add a node, click the **Add Node** tool from the Drawing Toolbar, position the cursor where you want to add the node, and click the mouse button. MapInfo Professional adds a node. You can move this node or delete it, just as you would any node.

   To delete a node, position the cursor over the node, click it, and press the **Delete** key. To delete the last node when creating a polyline or polygon, click the **Backspace** key.

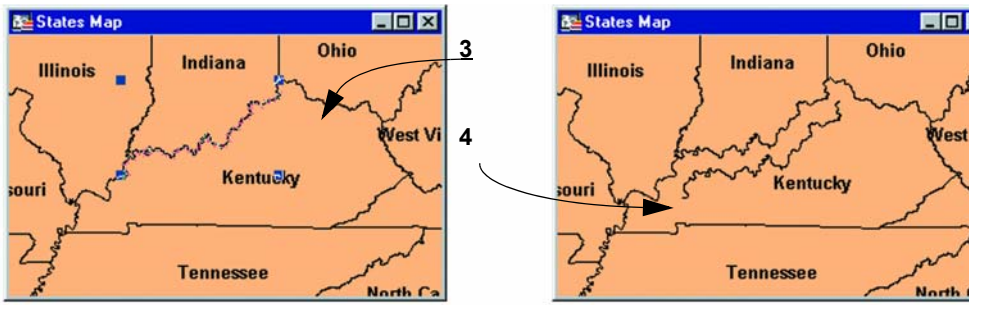
The **Reshape** command is very useful when you are creating sales territories or other merged boundaries. For example, you are merging postal code boundaries together to create school districts. Some postal code boundaries fall into more than one school district. Use the **Reshape** command to reshape the school district to incorporate a section of a postal code boundary.

Selecting Multiple Nodes

Reshape mode allows you to easily select nodes of an existing object and copy and paste them, drag them to reshape the object, delete them, etc. To trace an existing object, we recommend that you use the autotrace feature, which is explained in the next section, Snap to Nodes. The following illustrations show how to copy the border between Kentucky and Indiana.



***1** Select the object. Click* **Reshape mode** *to display the nodes.* ***2** Select the nodes you want to copy.*



***3** Choose* **Copy** *and* **Paste** *to display the new objects with edit handles.*

***4** Click and drag the object to move to another location.*

To reshape an object (such as the state of Kentucky):

1. Select Kentucky to enable **Reshape** mode.
2. Select the first node with the Select tool. **Shift-click** the last node to be copied. MapInfo Professional selects all nodes between following the shortest route. (To select all nodes *except* those between the shortest distance, use **Ctrl-click** with the **Select** tool.)
3. On the **Edit** menu, click **Copy** to copy the nodes to the clipboard.
4. Paste the duplicate nodes onto the map. On the **File** menu, click **Paste**. The object you copied is drawn on top of the original object as a polyline.
5. To move the polyline click it and drag the polyline to a new location.

Using "Snap To" to Select Nodes and Centroids

You can use nodes to reshape an object and align objects with each another. MapInfo Professional refers to this process as snapping to a node. In the Map window, regions, polylines, lines, arcs and rectangles all have nodes that can be attached (or snapped) to each other. When the Snap mode is enabled, MapInfo Professional searches for nodes and centroids as you move around a window. MapInfo Professional automatically snaps the cursor to a node or centroid when the cursor comes within the snap tolerance of the node. The crosshairs display when the node is "snapped to".

Note: You can also use the snap to capability to snap to visible centroids in region objects.

To toggle Snap to Nodes, press the **S** key. The Status Bar displays with the word "SNAP" when Snap mode is activated. When you activate the Snap mode, a circle displays around your cursor showing the size of the tolerance of the Snap mode in pixels. The **S** key acts like a toggle on/off switch. You can set the snap tolerance in pixels in the Map Window Preferences dialog box. The **Snap Tolerance** field allows you to specify a tolerance. If you set the snap tolerance to 3 pixels, whenever you move the cursor within 3 pixels of a node, the cursor will snap to the node.

Snap mode works in the Map Window and Layout window (but not raster layers). It works with all MapInfo Professional tools in the Main and Drawing toolbars except Pan, Drag Map, and Text tool. Additionally, snap mode works on object types, including regions, points, multipoints, collection objects, lines and polylines, rectangles, and arcs. It is not available for text objects, ellipses, and rounded rectangles. You set the Snap in one window at a time and can save it with your workspace.

Snap to Nodes applies to all selectable layers—this is useful if you are drawing an object in one layer and want to attach it to an object in another layer. If you do not want to snap to objects in certain layers, make those layers unselectable.

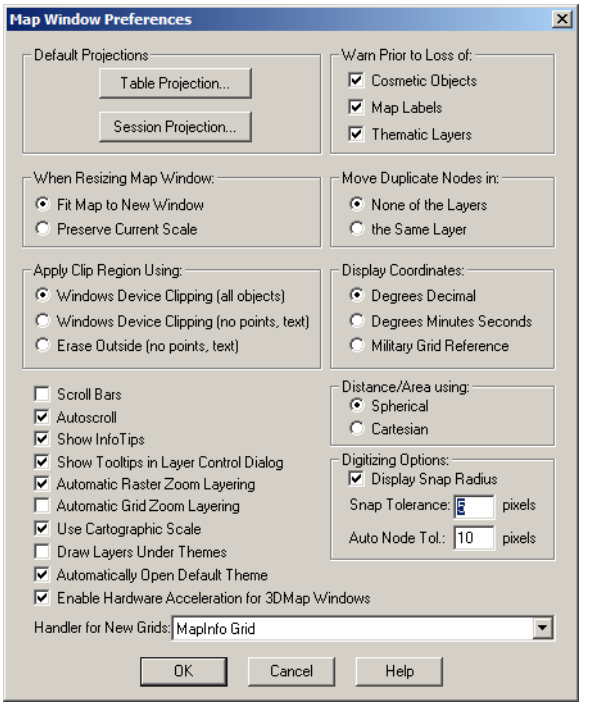
Snap and Thin Settings Saved in Metadata

The Snap and Thin settings remove self-intersections and overlaps in your data based on values you establish. When you complete your selections and entries in the Set Values for Node Snap & Thinning dialog box, MapInfo Professional saves these values to the table's metadata. This allows the Snap and Thin changes to be retrieved after the table is saved or you have left MapInfo Professional.

Setting Snap Preferences for a Visible Snap Area

The Map Window Preferences dialog box has a **Display Snap Radius** check box that controls whether or not the snap radius displays when Snap mode is on. The snap tolerance (in pixels) can also be selected.

- From the **Options** menu, select **Preferences**, then **Map Window** to display the Map Window Preferences dialog box.



Under the Snap Options section, you can change the snap tolerance to make the snap radius larger or smaller (measured in pixels). If you clear **Display Snap Radius**, the radius will not be displayed when snap mode is turned on. Remember to click **OK** to save your preferences.

Move Duplicate Nodes

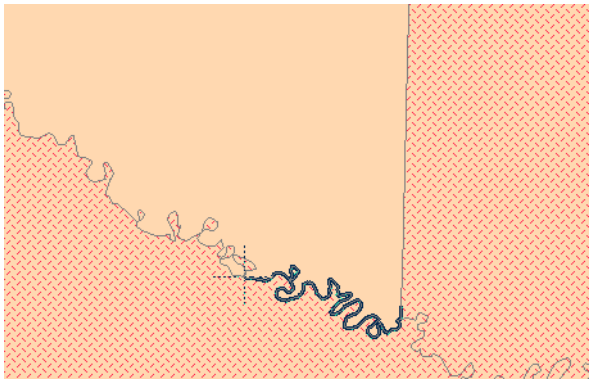
In most maps, nodes of various objects are usually connected, especially for adjoining streets and boundaries that share a common border. Using the Move Duplicate Nodes Option under Map Window Preferences, you can specify where MapInfo Professional looks for connected nodes in order to move them in unison. Choose the **None of the Layers** button to turn the option off. Choose the **Same Layer** button so that connected nodes in the same layer are moved when one of them is moved.

Autotracing Objects

You can trace the nodes of an object, for example, the Yucatan in Mexico using the Polyline or Polygon tools. This makes it easier to digitize objects that share a border because you don't have to re-digitize the shared border. You can also use this feature to trace an existing polygon/polyline network, for example, a street, a county, or some other polyline or boundary. A Status Bar entry displays showing that this mode is enabled.

To trace a border:

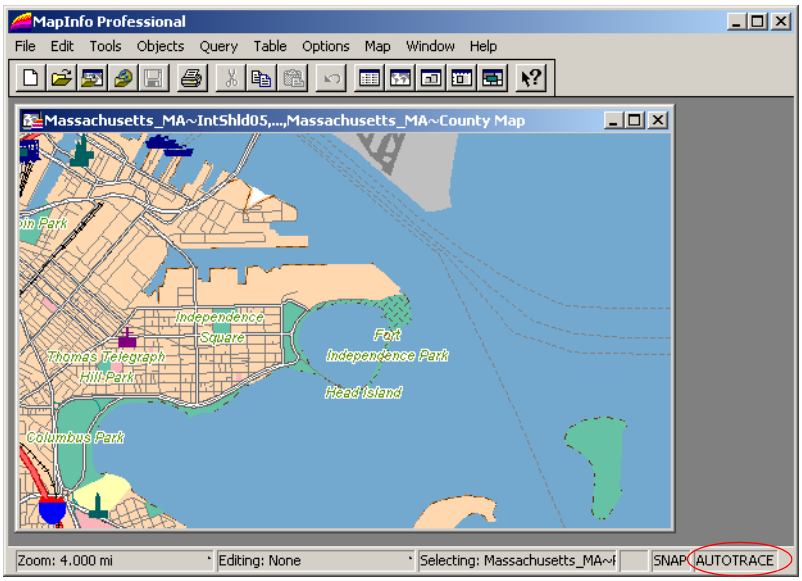
1. Open a Map layer you want to trace a polygon or polyline on.
2. Make the layer editable.
3. Press the **S** key to turn on the Snap process and the **T** key to turn on the Autotrace functionality.
4. Select the **Polygon** or **Polyline** tool from the Drawing toolbar and select the first node you want to trace.
5. Drag the mouse along the nodes of the line or object you want to trace.



The rules that apply to AutoTrace are:

- To enable the AutoTrace mode, you must be using a “poly” tool such as **Add Polygon** or **Add Polyline**
- You must press **S** to enable the Snap feature to use the AutoTrace feature

You can use the **Shift/Ctrl** key functionality for this mode. When you AutoTrace a polygon, the path contains the least number of nodes necessary to complete the AutoTrace, which is similar to the **Shift** key behavior. If you want to trace the longer path, press the **Ctrl** key to override default AutoTrace direction. When you are autotracing a closed polyline, the trace line never crosses the start and end points of the polyline (so the **Ctrl** key has no effect).



AutoTrace entry in Status Bar.

Smoothing and Unsmoothing Lines

You can use the Smooth command to convert polyline angles into polyline curves.

To smooth a polyline angle into a polyline curve:

- Click a polyline with the Select tool and on the **Objects** menu, click **Smooth**. MapInfo Professional smooths the line so that it appears to be one continuous line with curves instead of angles.
- To undo the process choose either the **Undo Smooth** command or on the **Objects** menu, click **Unsmooth**.

Both the Smooth and Unsmooth commands can be used only on polylines. A polyline is a line drawn with the Polyline tool. Smooth and Unsmooth do not work with objects drawn with the Line tool. If you attempt to smooth or unsmooth any object besides a polyline, MapInfo Professional displays a warning message.

Converting Regions to Polylines

You may find it necessary, on occasion, to change an object into a polyline or a polyline into a region during an editing session. You can do so simply by selecting the object and on the **Objects** menu, click **Convert to Region** or **Convert to Polyline**.

For instance, you select a group of nodes that you want to copy and paste elsewhere on your map. MapInfo Professional treats the group as a polyline and copies it to the clipboard. After you paste the polyline on your map, you can convert it to a region on the **Objects** menu, click **Convert to Region**.

If you want to create a buffer zone within one mile of a boundary, meaning you want a zone that extends one mile from the boundary to the outside and to the inside, you must first convert the region to a polyline and then create the buffer. If you first create the buffer on the region, you will include too much territory in the buffer (the entire region in the buffer plus the one mile buffer that extends outside of the region).

Converting objects to polylines and regions allows you to perform node-editing operations on objects that ordinarily do not allow node editing. For example, you cannot add nodes to a rectangle object. If, however, you first convert the rectangle into a polyline or region, you can then add nodes to the object.

The *Help System* contains these related topics:

- *Editing Street Maps (StreetPro)*
- *Adding a Segment to an Existing Street*
- *Adding a New Street*
- *Renaming a Street*
- *Editing Street Colors*

Merging One Map into Another

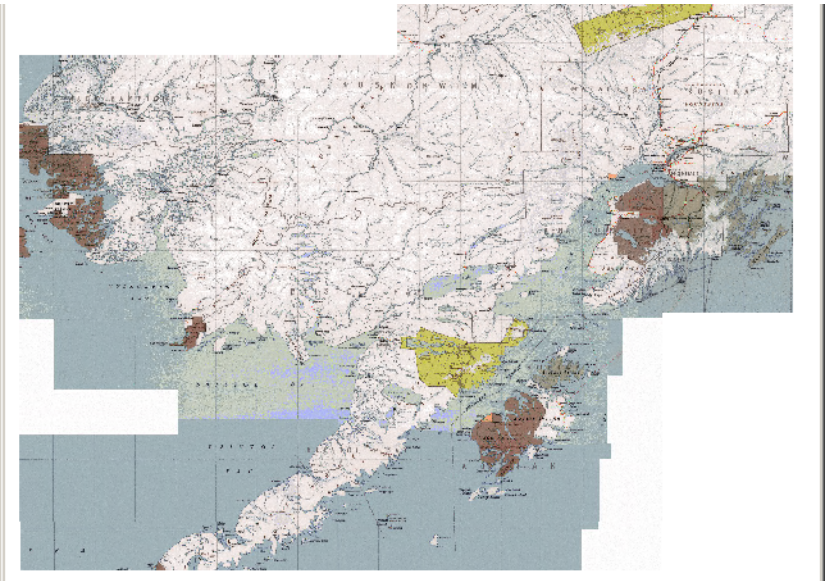
There are two ways to merge layers from one Map window to another:

1. You can use the Drag Map Window functionality to drag the layers of an existing Map window onto the another Map window. To see this method, see *Merging Maps using the Drag Map Window Tool* in the *Help System*.
2. You can copy the map layers you want from one map to the other in the Layer Control dialog box. To see this method, see *Merging Maps from Layer Control* in the *Help System*.

When you merge the layers from the source map on top of the destination map, the destination map settings take precedence. This means that the clip regions and coordinate systems, for example, are based on the settings in the destination map. If the destination map does not allow raster reprojection and the source map has a raster layer, the coordinate system of destination map could change.

Consider this example of a vector map and a raster map. Many times you want to add detail to a map by merging it with another open map. You can think of the map you are dragging or copying layers from as the source map.

Figure: Alaska Raster Map (Source Map)



You can think of the map that you are dragging or copying the layers to as the destination map.

Figure: Alaska Vector Map (Destination Map)

Note: MapInfo Professional does not copy the Cosmetic layer objects or thematic layers from a source map to the new window, so any symbols or features you have created there do not merge.

- For more information, see *Merging Maps using the Drag Map Window Tool* and *Merging Maps from Layer Control* in the *Help System*.

9

Selecting and Querying Data

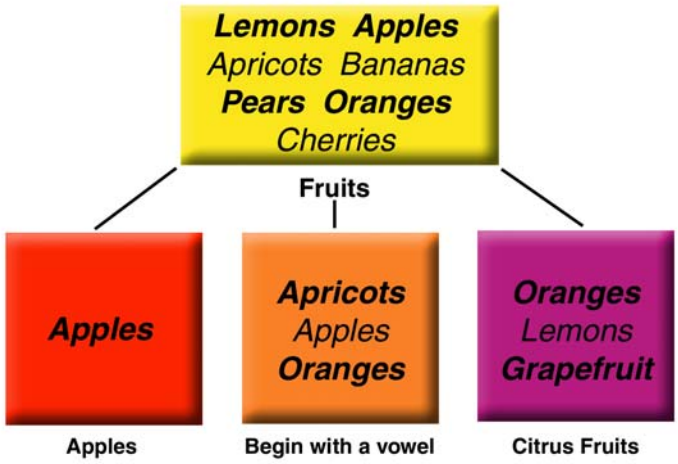
This chapter presents the ins and outs of selecting records from tables. As you use MapInfo Professional® you will find yourself selecting records quite often. This chapter covers an overview of selecting and querying methods using tools from the Main toolbar.

In this Chapter:

- Selecting Your Data in MapInfo Professional 302
- Querying Your Data in MapInfo Professional 310

Selecting Your Data in MapInfo Professional

While MapInfo Professional allows you to attach data to objects on a map, its true analytical power is its ability to group and organize data. Once your data is broken down into logical groups, you can analyze it based on one or more variables.



For example, you have a basket of fruit. You want to organize the fruit into different categories, based on one or more variables:

- Put all the apples into one group
- Put all the citrus fruit into one group (oranges, lemons, grapefruit)
- Put all the fruit that begins with a vowel into one group (oranges, apples, apricots)

There are many different ways that you could group the fruit. Some fruit would fall into more than one category (oranges are citrus fruit and also begin with a vowel). You could also use more than one variable to group your fruit — put all the citrus fruit that begins with a vowel into one group.

MapInfo Professional can retrieve information or even individual records from within your data. We refer to the record or records that are retrieved this way as *selections*. A selection is a subset of data that has been collected based on one or more variables.

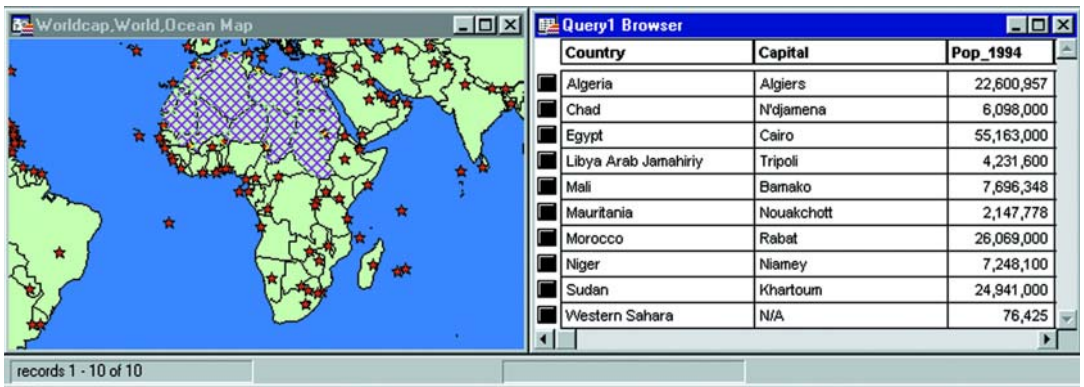
For example, you have a table of customer records. You could create a subset of all customers who live within a 50 mile radius of Prague. Or, you could create a subset of all customers who purchased over $1000 of merchandise. Or, you could create a subset of all customers whose last name begins with the letter “B”.

The statements above used to create these subsets are known as *queries*. A query is just another word for a question — which of my customers spent more than $1,000? Which of my customers lives within 50 miles of Prague?

As with the fruit example, there are many different ways to group your data. Some data records will obviously fall into more than one category. You could also use more than one variable to group your data. Which of my customers lives within 50 miles of Prague and purchased over $1000 of merchandise? This section gives you some examples and some practical applications of “selecting” in MapInfo Professional.

Characteristics of Selections

Selections are temporary tables. When you make a selection, MapInfo Professional creates this temporary table (called a selection) to store the records you’ve selected.



You can perform many of the tasks with a selection table that you can perform with a permanent (base) table such as:

- View it in a Browser, a Map window (if it has graphic objects), a Graph or a Layout window.
- Cut and copy it into the clipboard and paste it into another table, or even into another application.
- Use it to edit a table. If you want to edit only certain records in a table, you can get those records into a selection and then edit that selection.
- Make a further selection from it.

To convert selections into permanent tables, on the **File** menu, click **Save Copy As**. Once you’ve saved the temporary selection table as a permanent table, you can treat the new table like any other table. Selection tables are totally dependent on the table from which they were created. If you close a base table, all associated selection tables are deleted.

Selection Commands and Tool Descriptions

MapInfo Professional gives you a number of commands and tools for making selections. They fall into two categories:

- *Selecting from the screen*: Select tool, Radius Select tool, Boundary Select tool, Polygon Select tool, Marquee Select tool, Invert Selection tool, Select All command. To select records with the tools, click or encircle the associated graphic objects. To select records from a layer at the same time, on the **Query** menu, click **Select All**.
- *Selecting with queries*: Select, SQL Select. When you select records with either of these methods, you create a logical expression that MapInfo Professional uses to select the

records. For example, the expression SALES > 20000 means that MapInfo Professional will select only those records with sales higher than $20,000. We discuss Select and SQL Select in more detail in **Using Select to Create Queries on page 318** and **Using SQL Select to Query Data on page 321**).

1. Choose **Table > Import** to display the Import File dialog box. Choose **OS MasterMap** (*.gml) from the **Files of type:** drop-down list and navigate to its location.
2. Select a **GML file** to import. Click **Open**. The GML Import dialog box displays.

Selecting from the Screen

To select objects from the screen, the layer that contains the objects must be Selectable. To make a layer Selectable, on the **Map** menu, click **Layer Control** and select the **Selectable** check box for that layer.

When you select map objects in a Selectable layer, MapInfo Professional highlights the objects using the settings defined in the **Highlight Control** section of the Preferences dialog box (**Options** menu). When you select map objects in an Editable layer, MapInfo Professional places edit handles (small squares) around the extents of the object you selected.

If you have more than one Selectable layer in a Map window, MapInfo Professional selects objects from the topmost Selectable layer.

For example, you have a Selectable layer of county boundaries and a Selectable layer of state boundaries. If the county boundaries are in the topmost layer in the Map window, MapInfo Professional selects objects from the county layer. If the state boundaries are in the topmost layer in the Map window, MapInfo Professional selects objects from the states layer. When you use the Select tool, MapInfo Professional also displays InfoTips for the topmost Selectable layer. As you move your cursor over the objects, InfoTips display the object's label expression. You can turn off the InfoTips in the Map window Preferences (on the **Options** menu, point to **Preferences** and click **Map window**).

Likewise, if you perform a boundary search, the boundary object that you want to search should be in the topmost layer.

For example, you have a layer of postal code boundaries and a layer of state boundaries. If you want to select all objects that fall within a postal code boundary, the postal code layer should be the topmost boundary layer. If you want to select all objects that fall within a given state, the state layer should be the topmost boundary layer. You can reorder the layers by selecting the **Map** menu, and clicking **Layer Control**.

You can select objects from tables other than the topmost table, by holding down the **Ctrl** key when you are selecting an object. For example, say you have three selectable layers, such as STATES, COUNTIES, and CITIES. If you want to select objects in the STATES table, but it is the bottom layer in the Map window, do the following:

1. Hold down the **Ctrl** key and click the map with the **Select** tool. You are now in the second layer.
2. Hold down the **Ctrl** key and click the map again with the **Select** tool. You are now selecting objects from the third layer, the STATES layer.

Selecting a Single Object from a Map or Layout

Making selections is a basic MapInfo Professional operation, using the Select tool is only one way of making selections.

The tool must be active before you can use it; activate the tool by clicking on it. The tool's icon is highlighted in the **Main** toolbar and the cursor becomes a pointer. If you are editing records in a browser, the cursor becomes an I-beam.

To select a single object from a map or layout:

1. Click the **Select** button in the **Main** toolbar.
2. Click the object.

The layer where the object is located has to be selectable in the Map window. When an object is selected it is highlighted according to the settings you specified in **Options > Preferences**.

- When the layer is editable, the selected object is surrounded by edit handles and is colored and patterned as it was originally defined.
- When you select another object, the first object is unselected.
- To select a number of objects from a map or layout, hold the **Shift** key down and click the desired objects with the **Select** tool.

Selecting Tools

MapInfo Professional includes several tools on the Main toolbar to allow you to choose records for further viewing and analysis, including the Select tool, Radius Select tool, Marquee Select tool, Polygon Select tool, Boundary Select tool, and Invert Selection tool. Each tool is discussed in the next section.

Using the Select Tool

Use the Select tool to select objects one at a time or to select all objects that are generally in the same area of the Map window. You select an object by clicking it using the mouse.

To select an object using the Select tool:

1. Make the layer that you want to select objects from Selectable (on the **Map** menu, click **Layer Control)**.
2. Choose the **Select** button from the **Main** toolbar.
3. Click an object in the Map window. If that object's layer is selectable, MapInfo Professional highlights the object. If the layer is editable, MapInfo Professional puts edit handles around the extents of the object. If the layer is neither editable nor selectable, MapInfo Professional does not allow you to select the object.
4. On the **Window menu**, click **New Browser Window** to display selected records in a Browser. Choose Selection from the list of tables. MapInfo Professional creates a Browser of the new temporary table. To select records from the Browser, simply click each record with the Select tool.

To select multiple objects individually:

1. Click the first object to select it.
2. Hold down the **Shift** key and click another object. MapInfo Professional selects that object, too. If you select a second object without holding down the **Shift** key, MapInfo Professional unselects the first object and selects the second object.

- For additional instructions, see *Selecting the Next Selectable Object Beneath the Current Object* in the *Help System*.

Using the Unselect All Tool

Use the Unselect All to deselect all of the selected objects. You use this most often when you have selected too many objects and want to start over.

To select an object using the Select tool:

- Choose the **Unselect All** button from the **Main** toolbar.

Deselecting Objects and Removing Objects from the Selection

To deselect an object or remove it from the selection:

- Hold the **Shift** key down and then click the object. When you click, the object is removed from the selection set.

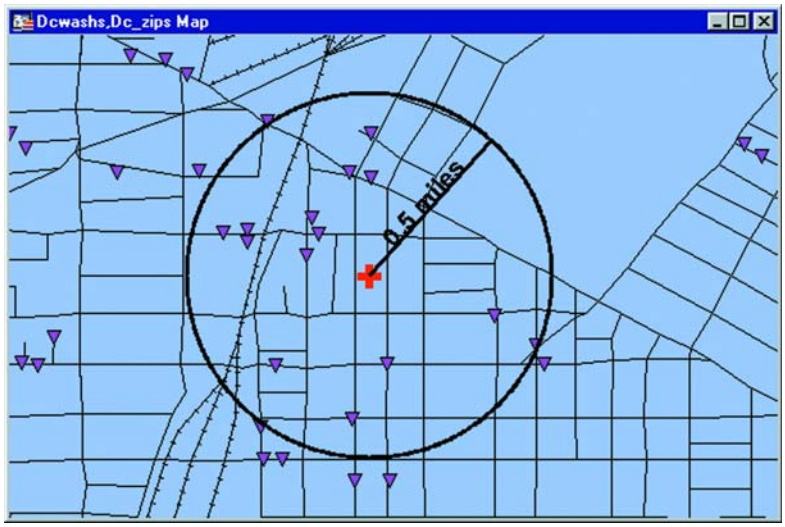
To deselect all objects:

- Choose **Query > Unselect All** or click someplace on the map where there are no objects.
- For additional information, see *Moving Selected Objects* and *Rotating Selected Objects* in the *Help System*.

Using the Radius Select Tool

The Radius Select tool is used to select all objects that fall within a given radius. For example, you have a table of blood donors and a table of blood donation sites. Using the Radius Select tool, you could create a temporary list of blood donors that live within a one-half-mile radius of each blood donation site.

The Radius Select tool selects all objects whose centroid falls within the circle. The object doesn't have to be completely bounded by the circle.



To select objects within a radius:

1. Make the layer you want to select objects from selectable (on the **Map** menu, click **Layer Control**).
2. Choose the **Radius Select** tool from the Main toolbar. The cursor becomes a hand when moved over the Map window.
3. Click a place on the map that you would like to use as the center point of your radius search. For example, if you want to select all the fire hydrants that fall within two miles of a fire station, click the fire station and use that as the center point.
4. Hold down the mouse button and drag the mouse away from the center point. MapInfo Professional draws a circle around the point and reports the radius of the circle in the Status Bar (lower left corner of the screen).
5. When you have the desired radius release the mouse button. MapInfo Professional highlights all map objects that fall within that circle.
6. To see a list of all the records that fall within that circle, choose **New Browser Window** from the **Window** menu. Choose **Selection** from the list of tables. MapInfo Professional creates a Browser of the new selection table.

Using the Marquee Select Tool

The Marquee Select tool is used to select objects within a rectangle. By clicking and dragging using the Marquee tool, you create a dotted rectangle, or marquee box around objects you want to select. All Selectable objects in the topmost Selectable layer will be included in the marquee box.

Note: To select objects from another layer, you must turn off selectable in **Layer Control** for the upper layers. Only objects from one layer at a time are selected.

To select objects within a rectangle:

1. Make the layer that you want to select objects from Selectable (click **Layer Control**).
2. Choose the **Marquee Select** tool from the Main toolbar. The cursor becomes a hand when moved over the Map window.
3. Click a place on the map outside of the area you want to include in the marquee box.
4. Hold down the mouse button and drag the mouse to form a dotted rectangle around the points you want to select.
5. When you have reached the desired rectangle size release the mouse button. MapInfo Professional highlights all map objects that fall within that rectangle.
6. To see a list of all the selected records, on the **Window** menu, click **New Browser Window**. Choose **Selection** from the list of tables. MapInfo Professional creates a Browser of the new selection table.

Adding Objects to the Selection Set

Use the **Shift** key with the **Marquee Select** tool when you wish to add newly selected objects to the previous selection.

Using the Polygon Select Tool

The Polygon Select tool selects map objects within a polygon that you draw on a map.

To select objects with the Polygon Select tool:

1. Make the layer that you want to select from Selectable (on the **Map** menu, click **Layer Control**).
2. Choose the **Polygon Select** tool from the Main toolbar. The cursor becomes a pointing hand when moved over the Map window.
3. Click the map location at which you want to place the first end point of the polygon. Move the cursor over your map in any direction. MapInfo Professional draws a line from the point where you clicked to the cursor.
4. Click to create another endpoint. Continue to move the cursor and click until you have the desired number of sides to your polygon.
5. To close the polygon, make your last click as close as possible to the first click. MapInfo Professional closes the polygon and selects the objects that are within it.

Note: Press **Shift** while using the **Polygon Select** tool to add newly selected objects to the previous selection.

Using the Boundary Select Tool

If you want to select objects that fall within a given region or boundary, use the Boundary Select tool. When you use this tool, MapInfo Professional selects all objects within any boundary on the map, such as state or county boundaries, police precincts, or sales territories.

For example, you have a layer of states and a layer of retailers. Using the Boundary Select tool, you could click a state and create a temporary list of all the retailers in that state.

To select objects within a region:

1. Make the layer that you want to select objects from Selectable (click **Layer Control**).
2. Choose the **Boundary Select** tool from the **Main** toolbar. The cursor becomes a cross hair when moved over the Map window.
3. Click within a boundary object. MapInfo Professional selects all objects that fall within that boundary.
4. To see a list of all the records that fall within that boundary, on the **Window** menu, click **New Browser Window**. Choose **Selection** from the list of tables. MapInfo Professional creates a Browser of the new selection table.

Using the Invert Selection Tool

The Invert Selection tool is a convenient way to select many objects at once. You simply select the few objects that you don't want, and then invert the selection to select all the objects you do want.

1. Make the map layer that you want to select from Selectable (on the **Map** menu, click **Layer Control**).
2. Make the **Select** tool active, and click one or two map objects.
3. Click the **Invert Selection** tool. MapInfo Professional selects all the objects that are not part of the current selection, and cancels the current selection. You can also find **Invert Selection** in the **Query** menu.

Unselecting Objects or Records

You may choose to:

- Unselect one object or record from a group of selected objects or records.
- Unselect a group of selected objects or records.
- Unselect all selected objects.

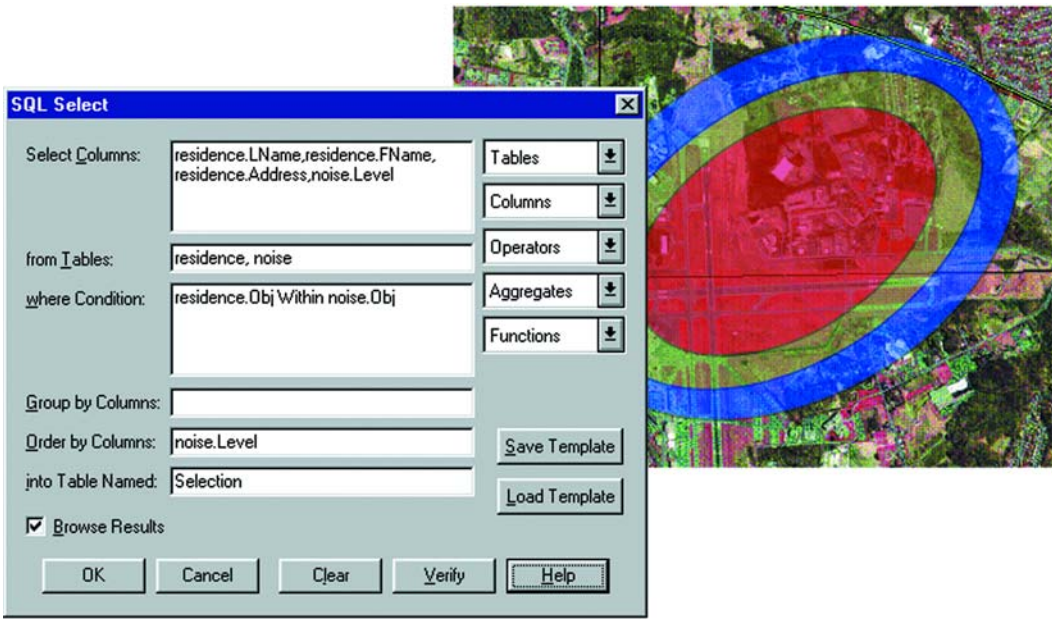
To cancel the selection of one object or record from a group of selected objects or records, hold down the **Shift** key and click the object or record with the Select tool. When you click it, the selection is cancelled.

To cancel the selection of all selected objects, you can either click the Map window where there are no objects or choose the **Unselect All** command from the **Query** menu.

Querying Your Data in MapInfo Professional

A *query* is a mathematical question that you pose to your database to collect information. In MapInfo Professional, there are two query builders available under the **Query** menu, **Select** and **SQL Select**.

Figure: SQL Query to Determine Homes Affected by Airport Noise Pollution



In the case of *Select*, you can pose a question of a single table. For example,

- Which of my customers spent more than $20,000?
- Which of my customers live in Vermont?

In the case of *SQL Select*, you can ask your question from one or several table(s) of information and perform these tasks:

- Derive new columns – columns that calculate new values based on the contents of your existing columns.
- Aggregate your data so that you see only a listing of subtotals instead of seeing your entire table.
- Combine two or more tables into one results table.
- Show only the columns and rows that interest you.

Selecting and Using Queries

Select allows you to query a table. It allows you to select records and objects from a table according to their attributes. You can use it to highlight objects in a Map or Browser window that meet certain criteria. You can also create a results table that you can browse, map, or graph like any other table.

For instance, by formulating queries with *Select*, you can ask MapInfo Professional to:

- Show only postal code regions where the average household income is above $65,000.
- Show only postal code regions where the median age is 42.
- Show only the postal code regions where the household income is above $65,000 and the median age is 42.
- Show only records for all orders received in July or September.
- Show cities of over 100,000 people in Texas, California and Florida.

When you are working in a Browser, MapInfo Professional highlights the records meeting the criteria of the query. When you are working in a Map window, the graphic objects of the chosen records are highlighted. When you are working in both windows, the objects in both are highlighted. In all cases, MapInfo Professional automatically creates a working table called Selection that contains the results of the query. You can browse, map, or graph this table like any other table. The table can also be saved as a separate table with **Save Copy As**.

Finding an Object or Street Address

To find an object or street address:

Your tables must be mappable and indexed. If you need to set up these components, see **File > New Table (Import)** or **Table > Maintenance > Table Structure**.

1. Choose **Query > Find**, a Find dialog box displays.
2. Click the **Search table** drop-down list and choose a table from which to search.
3. Click the **for objects in column** drop-down list and choose the column containing the location information of the objects you are looking for.

   You now have the option of refining the search. Use this option when you are trying to find an object or address whose name is not unique and is used for other objects or locations.

   For example, when you are searching for the town of Ipswich in Great Britain, do you want Ipswich in Suffolk county or Ipswich in Essex county. Refining the search by county allows you to specify the county for each town, rather than just the town name.

   - *Optional* - Click the **Refine search with table** drop-down list and choose a refining table (the table must contain regions, such as states, counties, census tracts etc.).
   - *Optional* - Click the **using boundary name column** drop-down list and choose your refining column, the column containing the name of the boundary.
4. Check the **Find in Front Window Only** check box when you want the Find operation executed only in the Front Window. When this check box is unchecked, the Find operation is executed in all windows. When checked, if features are found, they will be marked with a symbol in a Map Window. If the Browser window is the active window, it will be scrolled so the record appears in the Browser view.

   When you have finished defining *where* to look for your search data and selecting between the front most map and all maps then specify *what* data to look for.

5. Click **OK**. The Find dialog box displays. This dialog box allows you to specify what data to look for.

   The name of the column that you specified in the first Find dialog box is listed to the left of the list box (for example, Street). When locating a street address, type in "# Name", such as "30 Elm St" or "1045 Templar Blvd." What you type in depends on geocoding preferences specified in **Options > Preferences > Address Matching**.

   Note: MapInfo Professional comes with a text file called MAPINFOW.ABB [MapInfo Professional Abbreviations], that contains a list of common street abbreviations, such as "St" for "Street" and "Blvd." for "Boulevard," and so forth. These help MapInfo Professional to obtain exact matches. To familiarize yourself with the MAPINFOW.ABB file, you can take a look at its contents in the Notepad Text Editor.

6. Type the name of the object or address you are searching for in this box. If you have used the **Refine** option in the first dialog box, a second column name is listed (for example, ZIP).
7. Type the name of the refining boundary in this box. If MapInfo Professional cannot find an exact match for the object you specified, it lists possible matches.
8. Click **Up** or **Down** to move to other pages and choose a specific entry from the list.
9. Click **OK** and the find is initiated.

   You can also use the **Find** command to locate street intersections. When you type in the name of the object to be found in the second Find dialog box (enter object name to find), separate the two items by a double ampersand (&&). For example, to find the intersection of Congress Street and Christie Street, type "Congress Street && Christie Street."

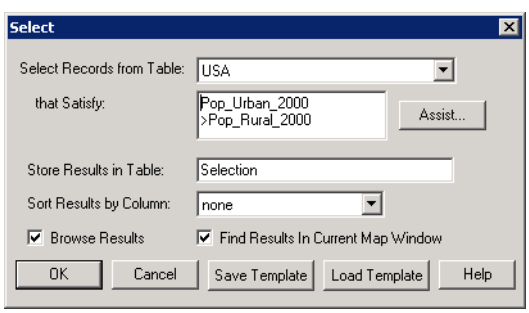
Finding and Displaying a Selected Object

When you create a query or a SQL query, you may want to see the results of that query visually on the map.

To find and display a selected object:

1. Do one of the following:
   - From the **Query** menu, select **Select** to display the Select dialog box
   - From the **Query** menu, select **SQL Select** to display the SQL Select dialog box

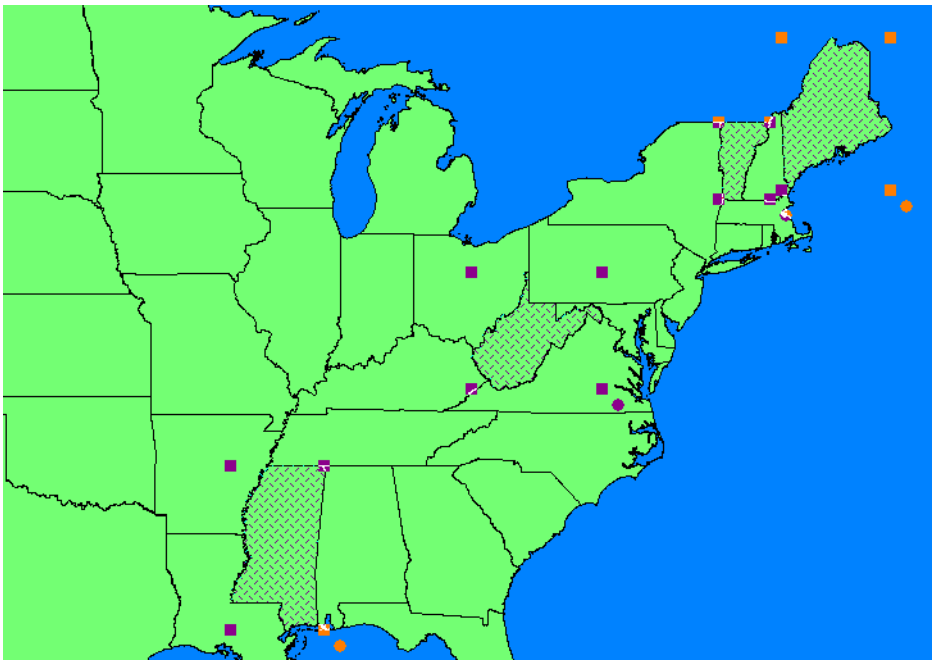
   The **Find Results in Current Map Window** check box displays in both dialog boxes.



2. Create your query and verify that it is correct, selecting the open table that you want to query.

3. Select the **Find Results in Current Map Window** check box to display the results upon completion.
4. Click **OK** to display the results.

Figure: Query Results of Urban Population > Rural Population



- For more information, see *Selecting All Objects from a Table* in the *Help System*.

Making Queries using the Select Command

MapInfo Professional has two commands for selecting objects through querying: Select and SQL Select. Select is simpler and SQL Select is more powerful.

To make a query:

1. Choose **Query > Select**. The Select dialog box displays.
2. Click on the **Select** records from table drop-down list and choose the table from which to select the records.
3. Type your query expression in the that satisfy box, or click the **Assist** button to display the Expression dialog box which helps you write an expression.
4. Type a name in the **Store Results** in table box for the temporary table that stores the results of your query or choose selection (the default). If Selection is chosen, MapInfo Professional automatically names the table Query 1, Query 2 etc.
5. To sort the query by the value in some column (optional) click the **Sort results by column** drop-down list and choose the column containing the value you want to sort with.

6. Click **OK**. A Browser window of your query results displays if the **Browse Results** box is checked.

You can use Select to highlight objects in a map or a table that meet certain criteria and create a results table that you can browse, map, or graph like any other table.

- When you are working in a Browser window, the records meeting the criteria of the query are highlighted.
- When you are working in a map, the graphic objects of the chosen records are highlighted.
- When you are working with both a Map window and a Browser window, the objects and the records are highlighted.

In all cases, a working table is automatically created called Query 3. This table contains the results of the query. You can map, or graph this table like any other table. The table can also be saved as a separate table with **Save Copy As**.

- For more information, see *Saving Queries* and *Loading Templates* in the *Help System*.

Making Queries using the SQL Select Command

To create a query using SQL Select:

1. Open the table you wish to query, if you haven't already done so. The table that you query is known as the *base table*. If you use SQL Select to perform a query on the World table, the World table is your base table.
2. Choose **Query > SQL Select**. Fill in the portions of the SQL Select dialog box that meet your needs. When you click **OK**, MapInfo Professional performs the query.

   MapInfo Professional extracts data from your base table, stores the query results in a special, temporary table, known as the *results table*. The results table contains only the rows and columns that meet your criteria. The default name of the results table is **Selection** (although you can specify a different results table name in the Into Table Named field in the SQL Select dialog box).
3. Open a Map window and/or a Browser window if you want to see the query results. By default, MapInfo Professional displays the results table in a Browser window automatically (unless you clear the **Browse Results** check box in the SQL Select dialog box).

   If your results table is called **Selection** (the default name), the Browser window shows a different table name, such as Query1 or Query2. This is because the moment you Browse the Selection table, MapInfo Professional takes a "snapshot" of the table, and names the snapshot Query*n* (where *n* is a number, one or greater). MapInfo Professional takes the snapshot because "Selection" is a special table name; Selection dynamically changes every time you select or de-select rows.

   In the SQL Select dialog box, you can enter a different name for your results table (e.g. you can name your results table My_Query). This prevents MapInfo Professional from renaming your results table Query*n*.
4. MapInfo Professional automatically selects all rows in the results table. Thus, after you perform SQL Select, you can perform operations on the entire set of selected rows. For example, you could apply a different fill color to all selected rows (by choosing **Options > Region Style**), or you could cut or copy all selected rows.

5. Usually, any alterations you make to the results table are automatically applied to your original (base) table. For example, if you use SQL Select to select some of the rows from the Orders table, and then you delete some of the rows from your results table, MapInfo Professional deletes the corresponding rows from your base table (Orders). However, if your query produces subtotals, you can alter the results table without affecting the base table.
6. Choose **File > Save As** if you want to make a permanent copy of the results table. If you do not perform Save As, the results table will be deleted when you exit MapInfo Professional.

For more information, see the following topics in the *Help System*:

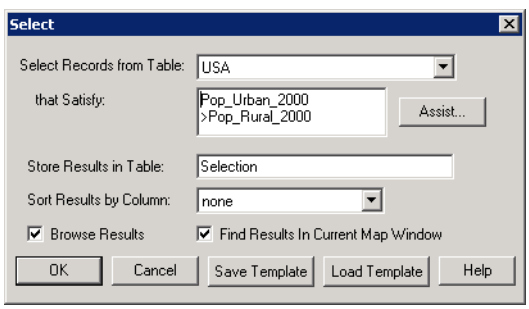
- *Using the SQL Select Dialog Box's Where Condition Field*
- *Updating a SQL Select Query Table*
- *Using the SQL Select Dialog Box's Select Columns Field Templates*

Displaying Query Results Quickly

When you create a query or a SQL query, you can display the results visually on the map.

To find and display the results of a query automatically:

1. Do one of the following:
   - From the **Query** menu, select **Select** to display the Select dialog box
   - From the **Query** menu, select **SQL Select** to display the SQL Select dialog box



*The **Find Results in Current Map Window** check box displays in both dialog boxes. If there are no open Map windows, this check box is disabled. You cannot save this check box setting to a template. This option is cleared by default.*

2. Create your query and verify that it is correct, selecting the open table that you want to query.
3. Select the **Find Results in Current Map Window** check box to display the results. Click **OK**.

- For more information, see *Choosing Which Columns Appear in the Results Table* and *Creating Statistical Calculations* in the *Help System*.

Creating Query Expressions

To perform a Select query, you must create an expression. An expression is a logical statement that is used to ask your question. For example, you have a table of apartments for rent. If you want to create a temporary table of all apartments that cost less than $800 a month, you could use the expression:

- RENT < 800

where RENT is the name of a numeric column that contains the per month rent rate.

MapInfo Professional searches the apartment table for all records that satisfy this condition and puts those records in a temporary table that you can map, browse, graph or carry out additional queries.

You can also perform mathematical operations on your data. For example, you want to create a temporary table of all apartments that have a total cost of less than $800. Total cost is equal to the sum of the rent and the monthly utilities.

You could use the expression:

- RENT + UTILITIES < 800

You are telling MapInfo Professional to add the number in the RENT column and the number in the UTILITIES column and then compare that number to 800.

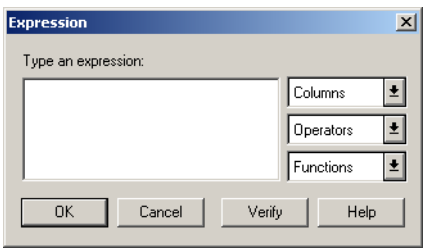
For more information, see **Creating Expressions on page 485** for details in creating a variety of expressions.

Specifying an Expression

There are two ways of creating an expression. The first method is to type in the expression directly. When you are creating very simple expressions, this method is usually faster. The second method is to press the **Assist** button in the Select dialog box and build your expression using the pop ups in the Expression dialog box. This method is particularly useful when you are just learning how to build expressions or when you are building very complex expressions.

To specify an expression:

1. Choose **Query > Select**. The Select dialog box displays.
2. Click the **Assist** button. The Expression dialog box displays.



3. Type your expression directly into this box, or choose from the drop down list selections to create an expression.
4. Click **Verify** to verify that your expression is valid.
5. Click **OK** to return to the Select dialog box.

6. Click **OK** to run the expression.

The Expression dialog box gives you three drop-down lists that you can use to build your expression: columns, operators, and functions.

Columns

This pop up lists every column in the table from which you are selecting. If the table contains derived columns from previous queries, those columns will also be listed.

Operators

This pop up contains mathematical and logical operation symbols. The mathematical operators in this pop up include addition, subtraction, multiplication, division, greater than, less than, and equal signs. You can use these symbols to create mathematical formulas. For example, from your table of sales representatives you want to select those sales representatives who, on the average, gross more than $2000 per month. Gross sales is computed by adding together sales and commission.

You have two columns in your table: TOTAL_SALES, which is total sales for the year for each representative and COMMISSION, which is total commission for the year for each representative. You could build the following expression:

- (TOTAL_SALES + COMMISSION) / 12 < 2000

This expression tells MapInfo Professional to add the number in the TOTAL_SALES column with the number in the COMMISSION column. However, this gives you gross sales for the year. We want average gross sales for the month. Therefore, we divide the sum by 12, which will give us a monthly average. We then compare that figure with 2000.

The Operators pop up also includes logical operators conjunctions AND, NOT, OR and LIKE. The LIKE operator can be used with two wildcard characters: '%' and '_'. The '%' character matches zero or more characters. The '_' character matches only one character.

Functions

This pop up contains mathematical functions that take one or more parameters and return a value. You use functions to perform basic mathematical functions on the data in that column. For example:

- abs(<number>)

takes the absolute value of the numbers in the specified column.

For example, a meteorologist wants to select all days where the temperature in her city was more than 10 degrees warmer or cooler than the national average. She has a column in her table, AVG_DIFF, that contains the difference between the national average and city average.

She could create the following expression:

- AVG_DIFF < –10 Or AVG_DIFF > 10

This expression tells MapInfo Professional to select all records that have an average difference less than -10 or greater than +10. However, she could also create the following expression:

- abs(AVG_DIFF) > 10

This expression tells MapInfo Professional to select all records where the absolute value of the average difference is greater than ten.

The Functions pop up contains many other functions, including area, perimeter, sin, cos, and date-related functions. For a complete list of functions, see **Chapter 16: Creating Expressions**.

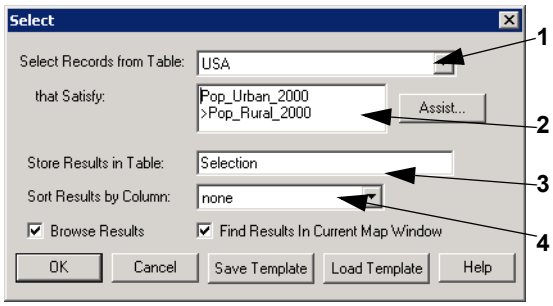
Verify

This button reviews the expression you have created and verifies that it is valid. This is particularly helpful if you are new to writing expressions.

Using Select to Create Queries

In general the process for selecting objects using Select is:

1. On the **Query** menu, click **Select** to display the Select dialog box.



***1** Select the table from which to select records.*

***2** Create the expression to select records.*

***3** Choose a storage place for results.*

***4** Choose column for sorting.*

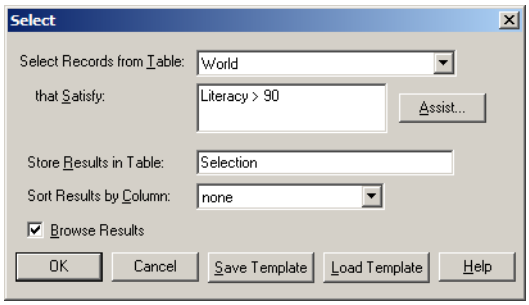
2. To see a list of the records you have selected, select the **Browse Results** check box. MapInfo Professional creates a Browser of the new selection table.
3. To display the query results in the currently active Map window, select **Find Results in Current Map Window**. If there are no open Map windows, this check box is disabled. You cannot save this check box setting to a template. This option is cleared by default.
4. Click **OK** to begin the query.

MapInfo Professional names the table Query1. It will name the next temporary selection table Query2. You can override MapInfo Professional's default name and give the selection a descriptive name. Type the new name into the Store Results in Table box. The table can also be saved as a separate table with **Save Copy As**.

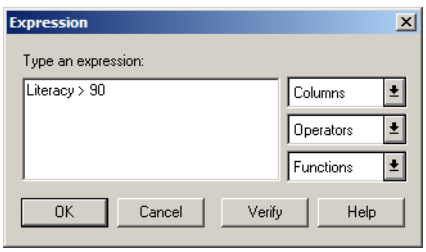
Example: Selecting

MapInfo Professional makes finding information and locations easy. You can use the **Select** feature to create subset databases. As an example, we use the WORLD table to select countries with a literacy rate greater than 90%.

1. Open the WORLD.tab table.
2. On the **Query** menu, click **Select** to display the Select dialog box.



3. Complete the Select dialog box:
   - **Select Records from Table** — From the **Select records from table** drop-down list, choose **World**.
   - **Assist** — Click the **Assist** button to display the Expression dialog box.



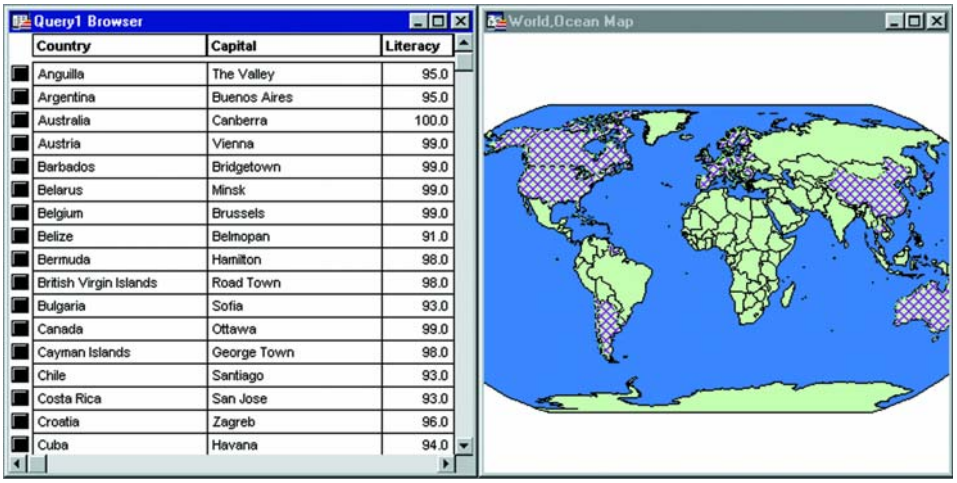
4. Complete the Expression dialog box as shown in the figure:

   From the **Columns** drop-down list, choose **Literacy**.

   From the **Operators** drop-down list, choose **>** (the greater than sign).

   Type `90`.

   Click **Verify** to confirm the syntax of your expression. Click **OK** to close the Verify dialog box.
5. Click **OK** to close the Expression dialog box. The Select dialog box redisplays.
6. Select the **Browse Results** check box.
7. Click **OK**. MapInfo Professional creates a Browser that contains the selections. Notice that the selections display in both the World map and Browser.



Country	Capital	Literacy
Anguilla	The Valley	95.0
Argentina	Buenos Aires	95.0
Australia	Canberra	100.0
Austria	Vienna	99.0
Barbados	Bridgetown	99.0
Belarus	Minsk	99.0
Belgium	Brussels	99.0
Belize	Belmopan	91.0
Bermuda	Hamilton	98.0
British Virgin Islands	Road Town	98.0
Bulgaria	Sofia	93.0
Canada	Ottawa	99.0
Cayman Islands	George Town	98.0
Chile	Santiago	93.0
Costa Rica	San Jose	93.0
Croatia	Zagreb	96.0
Cuba	Havana	94.0

Making a New Table Using a Subset of a File

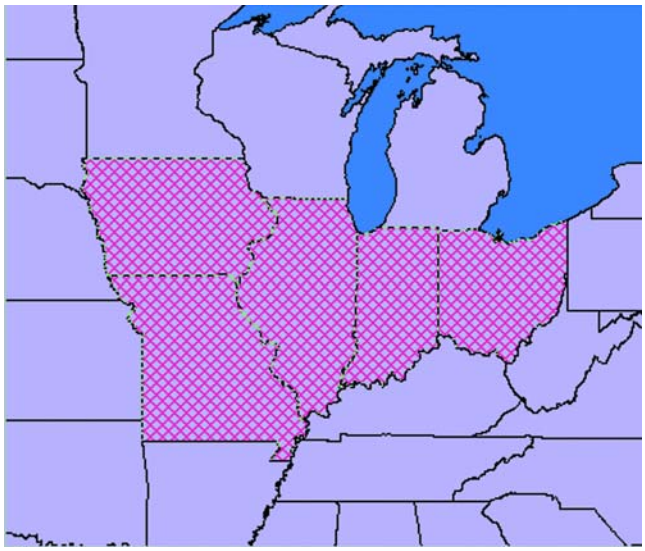
Many of the data sets that are used with MapInfo Professional include more objects and information than necessary for some projects. In many cases it is easier to work with a subset of the complete data product. For example, if you were tracking crime statistics for a county by census tract, you would not need the census tracts for the entire state.

There are two ways to create a new table that will contain a subset of the records from an existing file. You can interactively select the objects representing the records you would like to put in the new table using one of the select tools. Or, you can use the SQL Select command to choose a subset of objects based on an SQL function. For an example using the SQL Select command, see **Example 1 — Computing Population Density Using Area on page 322**. Saving the resulting table is the same procedure, whether you choose the objects interactively or use an SQL select statement.

Note: Many of the queries on the following pages can be done either by using the **SQL Select** command or through the simpler Select command. Because SQL Select is more versatile and more commonly used, the SQL Select dialog box is used in the following examples.

Interactively Selecting Objects

1. On the **File** menu, click **Open** and open the table in a Map window.
2. Select the objects that will make up the subset with the **Select** tool, **Radius Search Selector** tool, or **Polygon Search Selector** tool. **Shift-click** to select multiple objects.



3. On the **File** menu, click **Save Copy As** and save the Selection table. The table can be saved with any filename.

Using SQL Select to Query Data

A *selection* is a subset of data rows in a table, chosen based on the contents of one or more columns from the table. You create selections by formulating questions, or queries, about your data. How many customers live in the state of Idaho? Which police precinct has the highest rate of violent crime? MapInfo Professional stores the results of these questions in temporary tables called *query tables.*

In the first part of this chapter, we discussed selections and query tables as a result of using Query Select command. We now turn our attention to an extremely powerful and useful feature in MapInfo Professional, querying by SQL Select.

While MapInfo Professional's Select command lets you formulate sophisticated queries, SQL Select goes even further. The records in the query table generated by the Select command don't have any information in them that isn't contained in the records of the base table. They are, in fact, the same records. They have been arranged so that they can be viewed together.

With SQL Select you can create query tables containing information that was only implicit in the base table(s).

The SQL Select dialog box is one of the most elaborate ones in MapInfo Professional. But don't be intimidated. Once you learn what each box is used for, it is fairly simple to create powerful selection statements. You can type directly into the boxes or you can use the pop up menus on the right to enter items into the boxes.

The easiest way to describe the dialog box is to walk you through an example, step-by-step. This example uses data from the WORLD table included in MapInfo Professional, so you can try out this SQL Select exercise yourself. We have included a brief description of the parts of the dialog box with each step. A complete description of each box is given after the example.

Note: Expanding the text controls is no guarantee that the resulting query can be handled by MapInfo Professional. You can still receive the `Query too complex` error when adding larger queries.

Example 1 — Computing Population Density Using Area

In this example, we'll use the world map to create a table of all the countries that have a population density of over 500 people per square mile.

The following formula computes population density:

- POPULATION / AREA

While the WORLD table has a population column (pop_1994), it does not include a column for country area. However, since the WORLD table has graphic objects associated with the records, MapInfo Professional can compute the total area for each country.

Open the WORLD.tab table, and maximize its display by clicking the window's maximize button. On the **Query** menu, click **SQL Select** to display the SQL Select dialog box.

To complete the SQL Select dialog box:

1. In the **From Tables** box, choose **WORLD** from the **Tables** drop-down list.

   You can specify more than one table in an SQL statement. This example uses only one table, WORLD.

2. You should fill in the **From Tables** box before you fill in the **Select Columns** box. MapInfo Professional uses the tables in the **From Tables** box to generate the list of columns in the **Columns** drop-down list.

3. Place your cursor in the **Select Columns** box and delete the asterisk (*). In this example, we will specify a list of columns to be included in the resulting query table, instead of including all columns.

   Note: An asterisk (*) in the **Select Columns** box means by default that all columns would be queried.

   Remember, the query table is the temporary table that MapInfo Professional creates to store the results of the query.

4. Select **Country** from the **Columns** drop-down list.

5. Select **pop_1994** from the **Columns** drop-down list.

   Now, we need to compute population density. Remember, population density is computed by dividing population by area. There is no Area column in the table. However, there is a function, Area, which will compute the area of any mappable object. Since the WORLD table is mappable, MapInfo Professional can compute the area of each country and, therefore, the population density of each country.

6. Select the division sign (/) from the Operators list.

7. Select **Area** from the Functions popup.

   This creates a *derived* column. A derived column is a column that contains the results of calculations performed on another column or columns. When MapInfo Professional creates the query table, it will include two columns: the **Country** column and the **pop_1994/Area(obj, "sq mi") column**, which is our population density column. MapInfo Professional includes a units statement with all geographic functions. If you wanted MapInfo Professional to return the area in square kilometers, you would change "sq mi" to "sq km."

   Now, we need to build an expression that selects only those countries whose population density is over 500 people per square mile.

8. Tab to the Where Condition box and select **pop_1994** from the **Columns** drop-down list.

9. Select the division sign (*/*) from the **Operators** drop-down list.

10. Select **Area** from the **Functions** pop up.

11. Select the greater than sign (**>**) from the **Operators** drop-down list.

12. Type the number **500**.

    We have now built the expression "Select all countries whose population density (pop_1994/Area(obj, "sq mi")) is more than (>) 500 people per square mile."

13. Leave the **Group by Columns** box blank.

14. Tab to the **Order by Columns** box and select **Country** from the Columns list.

    The **Order by Columns** box allows you to specify the order the records in the query table will display. By selecting Country, MapInfo Professional will list the records in alphabetical order, according to country name.

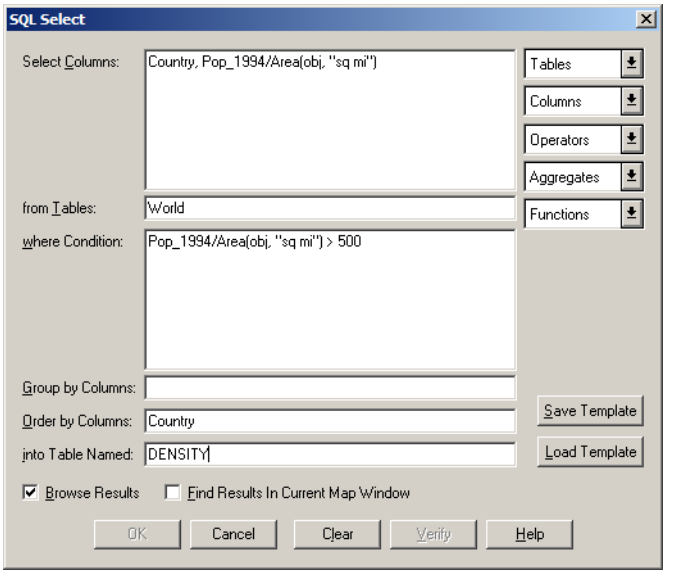
15. Tab to the **Into Table Named** box and type **DENSITY**.

    By default, MapInfo Professional names the query table Query1. Subsequent query tables will be named Query2, Query3, and so on. You can change the name of the query table by typing in a new table name in the Into Table Named box. MapInfo Professional will name the query table DENSITY.

16. Click **Verify**. MapInfo Professional checks the syntax of your SQL statement. If there are any errors in your statement, MapInfo Professional gives you an error message telling you what the error is and which box contains the error.

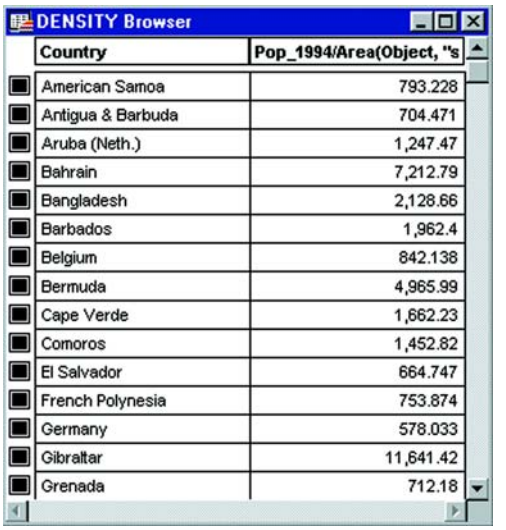
17. Select the **Browse Results** check box to create a Browser of the query table. If you do not select Browse Results, MapInfo Professional still creates the temporary query table but doesn't display it. If you wanted to display the table after the face, choose the **Browse** option in the **Window** menu and select **DENSITY** from the drop-down list.

18. To display the query results in the currently active Map window, select **Find Results in Current Map Window**. If there are no open Map windows, this check box is disabled. You cannot save this check box setting to a template. This option is cleared by default.



19. Click **OK** to create the following table.

The first column contains the country name. The second column contains the population density. Note that the countries are listed in alphabetical order (Order By: Country) and the population density for each country listed is over 500 people per square mile (pop_1994/ Area(obj, “sq mi”) > 500).

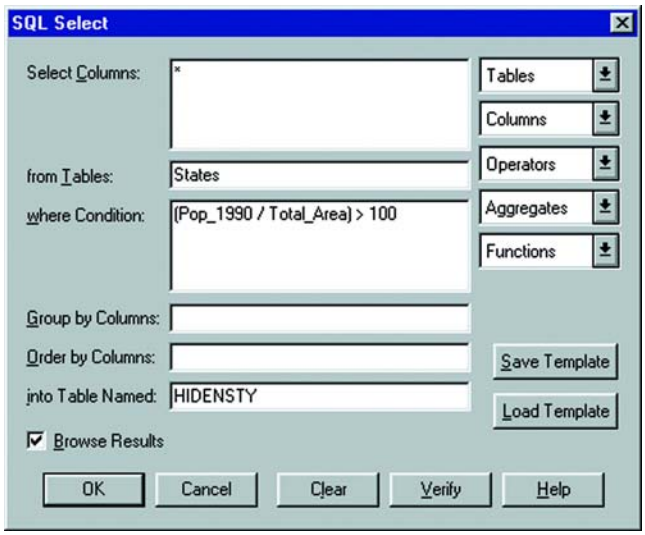


Country	Pop_1994/Area(Object, "s
American Samoa	793.228
Antigua & Barbuda	704.471
Aruba (Neth.)	1,247.47
Bahrain	7,212.79
Bangladesh	2,128.66
Barbados	1,962.4
Belgium	842.138
Bermuda	4,965.99
Cape Verde	1,662.23
Comoros	1,452.82
El Salvador	664.747
French Polynesia	753.874
Germany	578.033
Gibraltar	11,641.42
Grenada	712.18

Example 2 — Computing Population Density with SQL

To set up an SQL Select statement that selects only those states with a high population density, do the following:

1. On the **File** menu, click **Open Table** and open the STATES table in a Map window.
2. On the **Query** menu, click **SQL Select** and fill in the SQL Select dialog box.



This creates a new table, HIDENSTY, that contains only those states with a relatively high population density (population divided by total area). The asterisk (*) in the Select Columns box transfers all of the columns in the STATES table to the HIDENSTY table.

3. On the **File** menu, click **Save Copy As** and save the Selection table. The table can be saved with any filename.

For additional examples, see the following Help System topics:

- *Examples of Group by Columns*
- *Example - Using the Group by Columns Field to Subtotal the Results Table*
- *Example - Using the Order by Columns Field to Sort the Results Table*

Saving Queries

Any query created using the Select or SQL Select commands can be saved as an MapInfo Professional query table. Query tables consist of a .tab file and a .QRY file. After you have executed a Select or SQL Select statement, on the **File** menu, click **Save Query** to save the query as a table. When you open this table, the tables on which the query is based are re-opened and the query is re-executed.

Note: Queries made against other queries cannot be saved as a table or in a workspace.

Saving Queries to Workspaces

You can also save queries in workspaces. When you open a workspace that contains a query, the query will execute and any windows created by the query will redisplay. Unlike saving a query as a table, a separate .tab file is not created when you save a query to a workspace.

Note: To save queries to a workspace, the **Save Queries in Workspaces** check box must be selected in the Startup preferences. MapInfo Professional selects this check box by default.

Activating Save Query when Using a Workspace

To activate the **Save Query** option when using a workspace, you must activate the **Save Queries in Workspaces option** in the Startup Preferences dialog box.

1. Choose **Options** > **Preferences** > **Startup**. The Startup Preferences dialog box displays.
2. Check the **Save Queries in Workspaces** option (default setting).
3. Click **OK**.

If you selected this option and open a workspace, the associated queries are regenerated. A separate MapInfo Professional table (.tab) file for the queries is not created.

Note: Only queries created using the **SQL Select** or **Select** commands are saved in a workspace.

Using Templates for Queries

Query templates enable you to save Select or SQL Select statements as templates and reload them. This saves you the trouble of having to rebuild a query each time you want to use it. Both the **Select** and SQL Select dialog boxes have Load Template and Save Template options to enable you to do this easily. Query templates are useful for re-creating a query with an updated version of the table used in the original query, or for executing a query on a table that has the same fields as the table on which the query statement was created.

Loading a Template

You can load any saved query template.

To load a query template:

1. In the Select or SQL Select dialog boxes, lick the **Load Template** button. The Load Dialog From Query File dialog box displays. It lists the .QRY files.
2. Select the .QRY file you want to use, and click **Open**. The Select or SQL Select dialog box displays with the values from the template already filled in. Simply execute your query to create the query browser.

Renaming a Template

Rename a template by selecting and clicking the template name; enter a new name up to 64 characters.

Saving a Template

After you have finished writing your Select or SQL Select query, you can save the query as a template.

To save a query as a template:

1. In the Select or SQL Select dialog boxes, click the **Save Template** button to save the query to a template, or query file. The Save Dialog to Query File displays.
2. Give the query file a name, select a folder, and click **Save**. Query files are saved with a .QRY extension and are saved in the directory specified in the Directories preferences.

Note: The query does not need to be complete or syntactically correct to save it to a template.

Deleting a Template

To delete a template:

- Select the template name and press the **Delete** key. A dialog box displays prompting you to confirm or cancel the operation. If no templates of the given type exist, a button to restore a default template displays.

Deriving Columns

A derived column is a column in a query table whose contents are created by applying an expression to the values of columns already existing in some base table. In the example above, population density was a derived column. By default, the **Select Columns** box contains an asterisk (*), indicating that all of the columns in the base table are to be included in the query table. If you don't want all of those columns, you should delete the asterisk and list only those columns that you want to use. You aren't limited to creating one derived column. You can create as many derived columns as you want. Note that the more derived columns you create, the longer it will take MapInfo Professional to execute the query.

You can also created derived columns based on the aggregate functions *count, sum, avg, wtavg, max*, and *min*. For example:

- sum(Population)

would give you the population for the entire world.

- sum(Area(obj), "sq mi")

would give you the area for the entire world.

Creating Column Aliases

When MapInfo Professional creates a derived column, it uses the expression itself as the name for that derived column, which can be awkward. You can, however, specify an *alias* for the column. For example, the population density column in our DENSITY Browser was titled:

- Population / Area(obj, "sq mi")

To rename the column, add the new name to the Select Columns box when listing the columns.

The alias must follow the expression. It must also be separated from the expression by a blank space and enclosed in quotes. For example:

- Country, Population / Area(obj, “sq mi”) “POP_DENSITY”

When MapInfo Professional creates the temporary query table, the population density column will now be named POP_DENSITY.

You can use aliases to rename any column in a table, not just derived columns. For example, if each country in your table is a separate sales territory for your corporation, you might want to rename the Country column “TERRITORY”. The procedure is identical:

- Country “TERRITORY”, Population / Area(obj, “sq mi”) “POP_DENSITY”

For another example, see *Example — Computing Total World Population Density* in the *Help System*.

Aggregating Data

When you aggregate data, you perform a mathematical operation on all of a column’s values in all of the records in your table. Unlike the Select command, which only allows you to perform mathematical functions on individual records, SQL allows you to aggregate (or summarize) data across records.

MapInfo Professional looks for each *unique* set of data values in the specified column or columns and creates one row for each such unique set. When you aggregate data, you need to specify:

- How the records will be grouped.
- How the data will be aggregated (summarized).

For example, you have a table of sales representatives and their sales figures for the past three months:

SALES_REP	MONTH	SALES
John	May	1200
Cathy	May	900
Julie	May	1100
John	June	900
Cathy	June	1400
Julie	June	600
John	July	1200
Cathy	July	700
Julie	July	1000

MapInfo Professional could also compute the total sales for each representative by specifying in the SQL Select dialog box:

- Select Columns: SALES_REP, sum(SALES)
- Group by Columns: SALES_REP

SALES_REP	sum(SALES)
John	3300
Cathy	3000
Julie	2700

or MapInfo Professional could compute the average sales for each representative:

- Select Columns: SALES_REP, avg(SALES)
- Group by Columns: SALES_REP

SALES_REP	avg(SALES)
John	1100
Cathy	1000
Julie	900

or MapInfo Professional could compute the total sales for each month:

- Select Columns: MONTH, sum(SALES)
- Group by Columns: MONTH

MONTH	sum(SALES)
May	3200
June	2900
July	2900

MapInfo Professional has six aggregate functions:

- **Count**(*): counts the number of records in a group. It takes * as its argument because it applies to the record as a whole, and not to any particular field in the record.
- **Sum** (*expression*): calculates the sum of the values in <expression> for all group records.
- **Average** (*expression*): calculates the average of the values in <expression> for all the records in a group.
- **WtAvg** *(expression*): calculates the weighted average of the values in <expression> for all the records in a group.
- **Max** (*expression*): finds the highest value in <expression> for all records in a group.
- **Min** (*expression*): finds the lowest value in <expression> for all records in a group.

For more about grouping and ordering your data, see the *Help System*.

Joining Tables Using SQL Select

When performing an SQL Select operation with multiple tables, MapInfo Professional needs to join information from the records in the various tables. You may have a map table containing only graphic objects and their names and a table of statistical data for some geographic region. You want to display the statistical data on the map table. You could use SQL Select to create a query table in which your statistical data and map data are joined in one table.

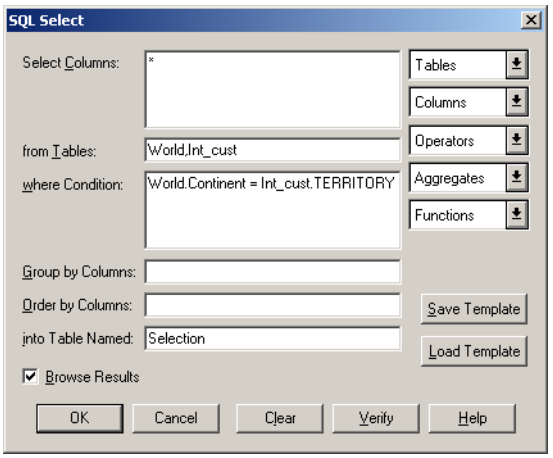
Whenever you are working with multiple tables, you must put a statement in the Where Condition telling MapInfo Professional how to match up the rows in the different tables. For example, you have the WORLD table that contains countries and a table of economic statistics (Eco_Stats), also broken down by country.

You want to create a query table that contains both sets of data:

- Select Columns: * (an asterisk indicates include all columns in the query table)
- From Tables: World, Eco_Stats
- Where Condition: World.Country = Eco_Stats.Country

The two columns that you want to match do not have to have the same name. For example, you have a table of international customers (Int_Cust) that contains a sales territory column (TERRITORY). This column contains continent names, since your company breaks up its sales territories according to continent. If you wanted to temporarily join the two tables:

- Select Columns: *
- From Tables: World, Int_Cust
- Where Condition: World.Continent = Int_Cust.TERRITORY



For an example, see *Example — Total Population and Area by Continent* in the *Help System*.

Using the Where Condition

The order of fields used in the Join does not matter. Either of the following syntaxes is acceptable:

```
Select * from A,B where A.field1 = B.field1
Select * from A,B where B.field1 = A.field1
```

However, keep in mind that when you switch the order of geographic operands, the geographic operator must also change. The following statements will produce identical results:

```
Select * from states, cities where states.obj contains cities.obj
Select * from states, cities where cities.obj within states.obj
```

Order of Clauses

The order in which Join clauses are performed does not matter. For example, each of the following are valid clauses:

```
Select * from Us_custg,States,City_125
where States.state = City_125.state and States.state = Us_custg.state and
Us_custg.order_amt > 10000
Select * from Us_custg,States,City_125
where States.state = City_125.state and States.state = City_125.state and
Us_custg.order_amt > 10000
Select * from Us_custg,States,City_125
where Us_custg.state = States.state and Us_custg.order_amt > 10000 and
States.state = City_125.state
```

Note: Some of the data used in this example is from the MapInfo Professional Tutorial, which is only available from the MapInfo web site, www.mapinfo.com/miprotutorial.

Error Handling

If an invalid Where condition that uses an OR as a logical operator is detected, MapInfo Professional will indicate an error has occurred. Usually this error will display whenever MapInfo Professional cannot find a join between two tables. For example, if you have specified the following incorrect condition:

```
Select * from A,B where A.field1 = B.field1  or A.field1 = B.field2
```

This error message displays:

```
No join specified between A and B. Invalid join condition in Where clause
```

Joining Tables Geographically (Using Geographic Operators)

When two tables have graphic objects, MapInfo Professional can join the tables based on the spatial relationship between those objects. Thus, even if your tables do not share a common column, you may be able to join the tables.

Geographic operators allow you to select objects on the basis of their spatial relationship to some other object. MapInfo Professional has a special column name you use with geographical operators: "obj" or "object". This column name refers to the graphic objects that are attached to your table.

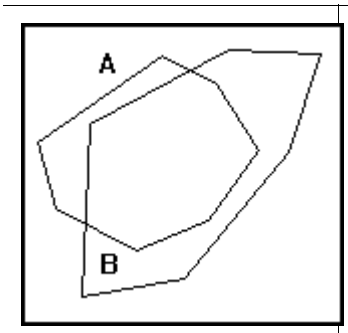
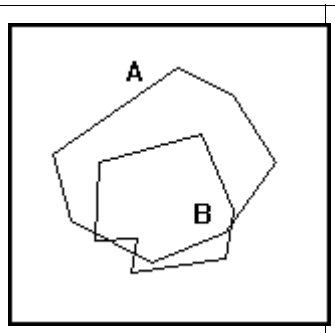
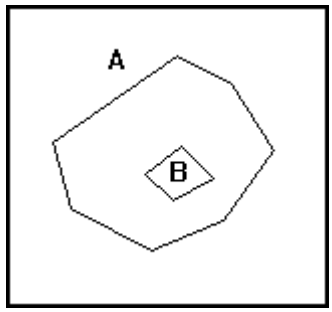
The geographic operators go between the objects being specified. Select the geographic operators from the **Operators** drop-down list.

The following table lists the geographic operators:

Contains	Object A Contains Object B if B's centroid is anywhere within A's boundary.
Contains Entire	Object A Contains Entire Object B if B's boundary is entirely within A's boundary.
Within	Object A is Within Object B if its centroid is inside B's boundary.
Entirely Within	Object A is Entirely Within Object B if A's boundary is entirely within B's boundary.
Intersects	Object A Intersects Object B if they have at least one point in common or if one of them is entirely within the other.

The difference between **Contains** and **Within** on the one hand, and **Contains Entire** and **Entirely Within** on the other, hinges on how the geographic comparison is made. For Contains and Within, the comparison is based on object centroids. For **Contains Entirely** and **Entirely Within**, the comparisons are based on the whole object.

The following graphic illustrates this point:

		
Object A contains Object B Object B within Object A	Object A contains Object B Object B within Object A	Object A contains Entire Object B Object B entirely Within Object A Object A intersects Object B Object B intersects Object A

In each case, object A contains object B because the centroid of object B is inside the boundary of object A. However, in the cases at the left and in the middle, part of object B is outside the boundary of object A. Only in the case to the right is all of object B inside object A. Only in this case could we assert "object A Contains Entire Object B" or "Object B Entirely Within Object A." Further, if A contains entire B, then A contains B, and If A is entirely within B then A is within B.

MapInfo Professional can perform a simple Contains or Within comparison more rapidly than a **Contains Entire** or **Entirely Within**. Therefore, unless you are absolutely sure that objects are completely inside other objects, you should use **Contains** and **Within** rather than **Contains Entire** or **Entirely Within**.

Geographic operators provide a way of joining tables. When there are no columns in the tables on which you can base your join, you can use a geographical operator to specify the join (in the Where Condition field). If you want to perform a query that involves both a Cities table and a States table, you can join the tables using either of the following expressions:

1. Cities.obj within States.obj
2. States.obj contains Cities.obj

In either case, MapInfo Professional finds the cities within each state and then associates a row for a city with the row for the state that contains it. In the same SQL Select query, you could also use aggregate functions to count the number of cities per state or to summarize city-based data on a statewide basis.

When you have a table of counties and one of customers, where counties are polygons and customers are points, you could specify a geographic join using either of the following geographic expressions:

1. Customer.obj within County.obj
2. County.obj contains Customer.obj

Geographic operators are particularly useful in conjunction with subselects.

Additional related help topics:

- *Joining Tables by the Order of the Rows*
- *Performing Subselects*

Joining Two or More Tables

Typically, you store your information in several different tables. You have your own data files, and you may also have various databases of statistical information that you purchased from MapInfo Professional. SQL Select allows you to create relational joins so that you can bring information from these various tables together into a single results table.

When you want to join two tables, you must determine whether one of the columns in the first table contains values that match one of the columns in the second table. Imagine that you have a table of counties that has demographic information--the population of people in various age ranges, ethnic groups, and occupational categories in each county. You may also have a database containing information about customer orders. You want to examine these two tables and see if certain kinds of orders come from counties having certain demographic characteristics. Perhaps you want to select counties according to combinations of orders and demographic characteristics. To do this you have to be able to join the two tables.

Suppose the counties table contains the name of the county. Similarly, one of the columns in the order table contains the name of the county in which the order originated. Thus, these two tables have one field in common, the county name. MapInfo Professional can use that common field to join the two tables.

CountyName	Pop_1980	Pop_1990		Order #	Customer	County
Foster	23,789	27,135		478001	Francis	Foster
Williamette	35,456	34,846		478002	James	Foster
Mason	147,101	151,201		478003	Wickwire	Mason

Counties Table Orders Table

Within the SQL Select dialog box, you use the Where Condition field to tell MapInfo Professional how to join the two tables. The SQL Select dialog box might look like this:

```
Select Columns: *
From Tables: Counties, Orders
Where Condition: Counties.CountyName = Orders.County
```

The order of the table names (in the From Tables field) is important. If both tables contain map objects, the results table will only retain the map objects from the first table listed in the From Tables field. Furthermore, when the query is complete, MapInfo Professional automatically selects some or all of the rows from whichever table is listed first in the From Tables field. Thus, in the preceding

example, MapInfo Professional will select some or all of the rows from the Counties table. The results table will also include data copied from the Orders table, but the Orders table will not be selected per se.

When you join two tables, the number of rows in the results table depends on how well the two tables match up. Suppose you have an Orders table with 10,000 rows, and you join the Orders table to the States table, which has fifty rows. The results table may contain as many as 10,000 rows. However, if some of the rows in the Orders table fail to match any of the rows in the States table, the results table will contain fewer than 10,000 rows. Thus, if 400 of the rows in the Orders table do not have a state name (perhaps due to data-entry errors), and if the relational join relies on the state name, the results table may only contain 9,600 rows.

You can use Update Column to modify the results of an SQL Select multi-table join. When you want to update a column in one table with information from another table, you can:

1. Join the tables with SQL Select.
2. Use Update Column on Selection. The update automatically takes effect in the appropriate base table.

- For more information, see *Performing Outer Joins* and *Using the Instr Function to Find Data* in the *Help System*.

Finding Duplicate Values in a Column

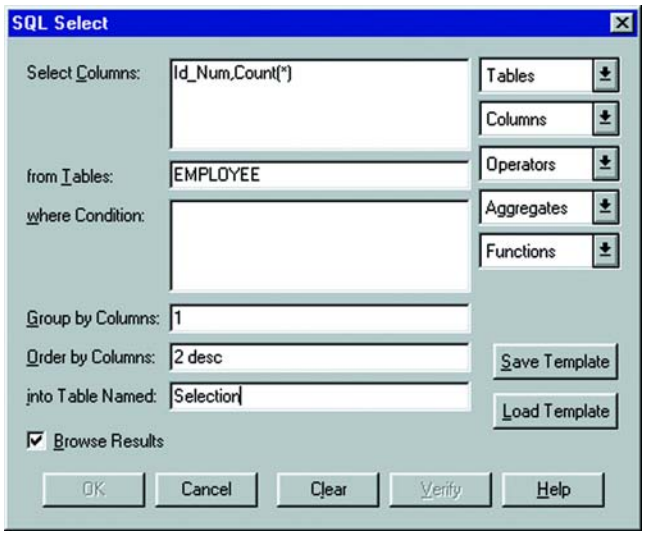
Often data is entered into tables by many different users. Sometimes data is repeated, or there is common information in several different records. This section explains how to find all rows in a table that, for a given column, share a value with another row. This is accomplished by performing two SQL Select statements.

The first SQL Select statement produces a query table with two columns. The first column is a list of all unique values in the data column and the second column lists the number of times that each unique value occurs. The second SQL statement compares each data column value with all rows in the Query table where the count is greater than one.

In the next example, there is a table EMPLOYEE that has two columns Id_Num and Name.

To find the duplicate values, perform the two SQL Selects, modifying them where indicated.

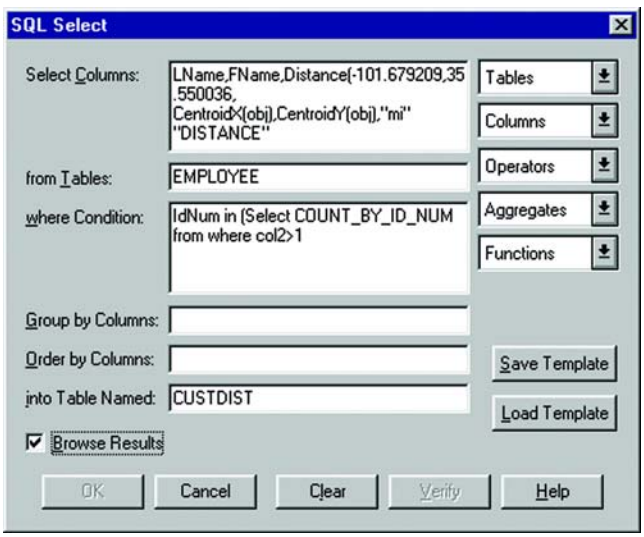
1. On the **Query** menu, click **SQL Select** and fill in the SQL Select dialog box.



Substitute the name of your data column for *ID_Num* and the name of your table for *EMPLOYEE*. The number 1 in the Group By Columns box will group the row by ID_Num (the first column). The 2 Desc in the Order by Columns box will arrange the records in descending order based on the values in the count(*) field (the second column).

This SQL Select statement returns a query table with two columns. The first column contains every identification number possessed by at least one employee. The second column contains the number of employees that have that identification number. The rows are sorted by the number of employees that have each id number (i.e., the count).

2. On the **Query** menu, click **SQL Select** and fill in the dialog box.



Also, change EMPLOYEE to the name of your table and ID_Num to the name of your data column.

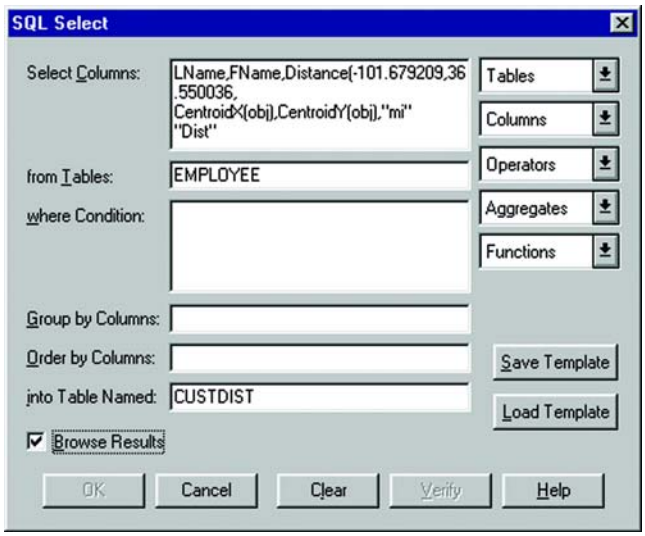
In the example, the SQL statement returns a query table containing all of the rows from EMPLOYEE with duplicated data column values. The where condition selects all rows from EMPLOYEE that have an identification number that is the same as one of the ID numbers in the Count_By_ID query table. This sub-select finds all identification numbers that occur more than once.

Calculating the Distance to a Fixed Point

In MapInfo Professional it is possible to calculate the distance from one point to another. This example shows how to calculate the distance from a fixed point to every point in a geocoded table and store the result in another table.

1. Determine the location of the fixed point. To find the position of a symbol on the map, double-click the symbol with the Select tool. In this example, the X value is -101.697209 and the Y value is 35.550036.
2. On the **Query** menu, click **SQL Select** and fill in the SQL Select dialog box, substituting your X and Y values for the values mentioned above

   As in the previous SQL query, replace ***EMPLOYEE*** with the name of your table, and ***ID_Num*** with the name of the relevant column from your table.



3. Click **OK**. The resulting query table contains last names and first names plus a new column called DISTANCE which records the distance between the fixed location (-101.697209, 36.550036) and the point associated with each row of the table.
4. To save the results in a permanent table, on the **File** menu, click **Save Copy As**, and save the CUSTDIST table.

For instructions on entering SQL queries using the Expert button, see the *Help System*.

10

Creating Thematic Maps, Legends, and Other Maps

Thematic mapping is a powerful way to analyze and visualize your data. You give graphic form to your data so that you can see it on a map. Patterns and trends that are almost impossible to detect in lists of data reveal themselves clearly when you use thematic shading to display the data on a map.

You can create thematic maps with MapInfo Professional® using the following methods: ranges of values, graduated symbols, dot density, individual values, bar and pie charts and continuous grid. There are also several variations on and options within these methods, such as bivariate thematic mapping and inflection point, that give you even more ways to analyze your data.

In this Chapter:

- MapInfo Professional in Action. 340
- Using Thematic Mapping to Analyze Information 340
- Types of Thematic Maps 344
- Working with Thematic Maps and Legends. 362
- Updating Columns using Thematic Mapping 365
- Working with Legends 369
- Working with Grid Surface Maps 374

For clarification of the uses of thematic maps in MapInfo Professional, see *MapInfo in Action* in the *Help System*.

The *Help System* also contains these related topics:

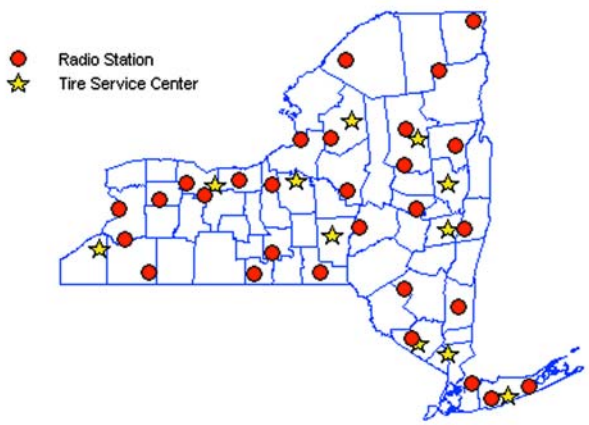
- *Bivariate Thematic Mapping*
- *Working with 3D and Prism Maps*

MapInfo Professional in Action

Since you have all the tools you need to make effective and useful maps, it is time to talk about what makes a map effective and useful. Whatever you need your map to say, whether it is to convey information, calculate distances between health care providers and their patients, or get a count of the number of customers that live within a given radius of an outlet location, MapInfo Professional can help you do that. By making selections from your table, you can extract information from sets and subsets of your data or see patterns and distributions, getting answers to such questions as: Which of my customers bought more than $5000 of equipment? Which of my customers is located within a 200 mile radius of my warehouse? Which of my customers bought more than $5000 of equipment and is located within a 200 mile radius of my warehouse? For more on selecting, see **Selecting Your Data in MapInfo Professional in Chapter 9 on page 302**, and **Querying Your Data in MapInfo Professional in Chapter 9 on page 310**.

MapInfo Professional refers to this grouping of like information as thematic mapping.

- For an example, see *Can You Give Me an Example* in the *Help System*.



Using Thematic Mapping to Analyze Information

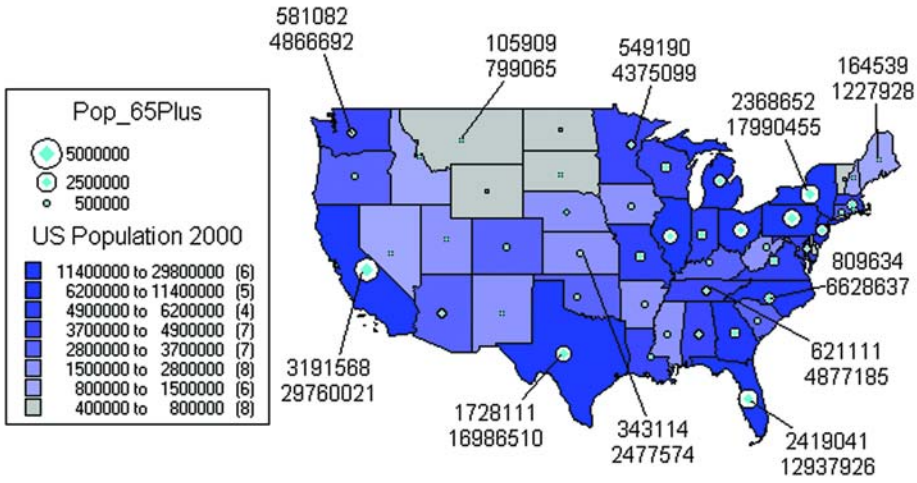
Thematic mapping is the process of enhancing your map according to a particular theme. At the cornerstone of the theme is the data in your table. Themes represent your data with shades of color, fill patterns, symbols, bar and pie charts, and grids.

With MapInfo Professional, you create different thematic maps by assigning these colors, patterns, or symbols to map objects according to specific *values* in your table. MapInfo Professional's bar and pie charts allow you to make data comparisons for each record. Grids allow you to see continuous change of your data across an area.

The Thematic Map feature uses a wizard made up of a series of three dialog boxes to help you choose the type of thematic map you want, the table(s) and fields that will be used to construct the map, and a variety of options to customize your map.

MapInfo Professional's thematic templates make it easy to start constructing a theme. Just choose a template that represents the type of thematic map you want. The templates are fully customizable and can be saved as new templates for future thematic mapping needs. More than 40 templates ship with MapInfo Professional.

Figure: Comparison of Senior Population to Total U.S. Population



Planning Your Thematic Map

Before you create a thematic map, it is important to know about the elements that make up a thematic map and how to put them together. This section will discuss thematic variables, where you can obtain your data, using data from the same table or another table, and the arrangement and display of thematic layers.

What is a Thematic Variable

The data that you display on your thematic map is called the thematic variable. Depending on the type of thematic analysis you are performing, your map can show one or more thematic variables. Ranges of values, grid shading, graduated symbols, dot density, and individual values maps all examine one variable. With bar or pie charts, you can display more than one thematic variable at a time.

A thematic variable can also be an expression. Choose Expression from the field list in place of a data field to construct a statement that derives information from the data in your table(s). Although an expression can be made up of more than one variable (for example, POP_1990 – POP_1980), for purposes of thematic mapping, a complete expression is equivalent to one thematic variable. See **Querying Your Data in MapInfo Professional in Chapter 9 on page 310**, and *Creating Expressions* in the MapInfo Professional *User Guide,* which is located in the Documentation subfolder of your installation directory, for more detailed information.

You can also create bivariate thematic maps, where one map object, such as a symbol, represents two different pieces of data. The symbol color, for example, can represent one thematic variable, and the symbol size can represent another.

Where to Obtain the Data

Before you begin your thematic map, you need to decide what information you want to display and locate where that information resides. It can either be in the table on which you are basing the map, or it can be in another table.

If the data is in the same table on which you are basing the map, choose the desired field directly in the **Field** list box in the Thematic – Step 2 of 3 dialog box.

If the data is in another table, you must first bring the data into the table on which you're basing the thematic map. This requires creating a temporary column using Update Column.

Each situation is described in the next few sections.

Using Data from the Same Table

If you are using data from the same table, choose the table and field on which you want to base your thematic map in the Thematic – Step 2 of 3 dialog box.

For example, you have a table of parking meters that contains the location of the parking meter and the last time the parking meter was emptied. Using Individual Values you want to shade the parking meter symbols according to the last time each meter was emptied. MapInfo Professional will assign a color to each time. In Step 2 of 3, choose the parking meter table as your table, and choose the field that contains the time each meter was emptied.

Using Data from a Different Table

The Join feature within the Thematic – Step 2 of 3 dialog box enables you to use data from other open tables to create a thematic map. Choose **Join** in the **Field** list box to display the Update Column dialog box where you can create a temporary column in the base table.

The temporary column can contain data taken directly from the other table, or you can aggregate the data to create derived information for the temporary column.

For example, you have two tables: a table of county boundaries and a table of police stations. You want to shade the table of county boundaries according to the number of police stations in each county.

To do this, all the information you want to use must be in the county table. Therefore, you must add police station data to this table.

Using Update Column, you create a temporary column in the county boundaries table that will store the police station information. To create this column, the two tables must have a link so that MapInfo Professional can access the data that goes into the temporary column. The link can either be a matching field (like county name), or you can make the link geographically (police stations contained within counties).

An example later in this chapter explains more about Update Column.

- For details on how thematic mapping works, see *Methods of Thematic Mapping* in the *Help System*.

Methods of Thematic Mapping

When you create a thematic map in MapInfo Professional, the thematic shading is added to your map as a separate layer. It is drawn on top of the base map layer.

Separating Thematic Layers

Separating thematic layers from the base map layer provides you with several important options:

- Graduated symbol thematic maps do not require that your base map contain point objects. Instead, graduated symbol objects are built regardless of the map object type. Therefore, even if your base map contains region or line objects, you will still be able to create a graduated symbols map.
- You can have multiple thematic layers per base map layer. In some cases, you do not have to add another base layer to the map to create another thematic layer. You can display more than one thematic layer at a time, as well as perform bivariate thematic mapping.
- You can use Layer Control to turn the display on or off for a given thematic layer. The layer it is based on can continue to display. You can also set individual zoom layers on thematic maps.

Ordering of Thematic Layers

To display thematic layers properly, they must be in a specific order. This is especially important when you want to display more than one thematic layer at a time. For example, you would want pie or bar charts for an area map to display on top of regions that are shaded in order to see them.

The following lists the order of map layers from top to bottom (note that map layers are drawn from the bottom up):

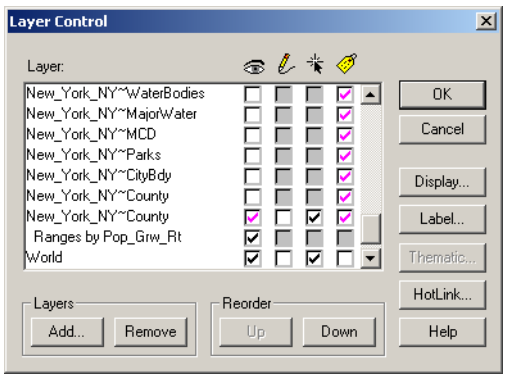
1. Pies, Bars, or Graduated Symbol thematic layer.
2. Dot Density thematic layer.
3. Ranged thematic layer – where Color or Size Attributes are applied.
4. Ranged (or Individual Value) thematic layer – where All Attributes are applied.
5. Major layer or base layer.
6. Grid thematic layer.

When you create a new thematic layer, MapInfo Professional automatically inserts it into its proper place.

Displaying Thematic Layers

You can turn the display on and off for thematic layers the same way you can for other map layers. All the display settings in Layer Control are also applicable to thematic layers, enabling you to set a zoom level for each thematic layer. You can also access the Modify Thematic Layer dialog box through Layer Control by clicking the **Thematic** button.

Figure: Layer Control (Showing Thematic Layer above Base Map)



Thematic layers are displayed in the list with this naming convention:

```
<Thematic type> with/by <variable-list>
```

The type of thematic map is noted first, followed by the list of variables used to create the map. For example, a pie thematic layer that uses commuting data is listed this way:

Pies with ComAlone, ComCarpool...

The variable list is truncated if there is not enough room to display each variable in your analysis.

Types of Thematic Maps

With MapInfo Professional you can create seven types of thematic maps:

- Ranges
- Bar Charts
- Pie Charts
- Granulated
- Dot Density
- Individual
- Grid

Each has its own purpose and unique attributes. For example, using Ranges of Values, you could thematically shade a map of the world according to population density. You could shade the countries with graduated shades of red, the darkest red representing the most densely populated countries, and the palest red representing the least densely populated countries. At a glance you can see the distribution of the world's population.

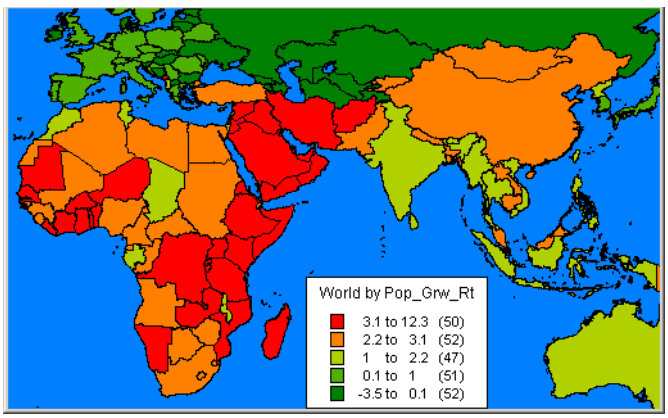
You are not limited to representing numeric values with thematic mapping. Nominal values also may be shaded thematically. For example, you have a table of underground cables. Those cables that haven't been serviced in the past six months are labeled priority status. Using Individual Values, you can shade the cables according to their repair status. All records with the same value will be shaded the same. See the individual sections later in this chapter for more information on each type of thematic map. They offer general information on the methods available for creating thematic maps. For more information on any of these methods and options, see *Thematic Mapping* in the *Online Help.*

Ranged Maps

When you create a ranged thematic map, MapInfo Professional groups all records into ranges and assigns each record's object the color, symbol, or line for its corresponding range. For example, if you wanted to visualize the population of the world by growth rate, you would shade countries according to their reported growth rate amounts.

With the Ranged map feature, MapInfo Professional groups the growth rate amounts into ranges. For example, in the next table, all countries that had growth rates between zero and one percent are grouped into one range. Countries that had growth rates between one and 2.2 are grouped in a separate range. Countries that have rates between 2.2 and 3.1 are in a third range, and those countries reporting greater than 3.1 are in a fourth range.

Figure: Ranged Map



All records are assigned to a range and then assigned a color based on that range. For example, the countries with the higher growth rates are shaded in red. The other ranges are shaded in lighter shades of red to light green and finally darker green. When you display the map, the colors make it readily apparent which locations have the highest growth rate in relation to their neighbors.

Ranges are also useful when the size of the region is not directly related to the magnitude of the data values. In our population density example in this section, we see that countries that are small in size can be very densely populated, and countries that are large in size may not be densely populated. Differences like these are more readily apparent when the regions are shaded in this manner.

Types of Ranged Values

MapInfo Professional can create ranges automatically using five methods: Equal Count, Equal Ranges, Natural Break (Standard Deviation), Quantile, and Custom. To set ranges manually, use Custom.

Equal Count has the same number of records in each range. If you want MapInfo Professional to group 100 records into 4 ranges using Equal Count, MapInfo Professional computes the ranges so that approximately 25 records fall into each range, depending on the rounding factor you set.

When using Equal Count (or any other range method), it's important to watch out for any extreme data values that might affect your thematic map (in statistics, these values are referred to as *outliers*). For example, if you tell MapInfo Professional to shade according to Equal Count with this database:

John	5000	Andrea	7000
Penny	6000	Kyle	5500
Miguel	4500	Angela	7500
Linda	5000	Elroy	6000
Ben	100	Mark	7000

Ben and Miguel are grouped in the same range (since they have the two lowest values). This may not produce the results you want since the value for Ben is so much lower than any of the other values.

Equal Ranges divides records across ranges of equal size. For example, you have a field in your table with data values ranging from 1 to 100. You want to create a thematic map with four equal size ranges. MapInfo Professional produces ranges 1–25, 25–50, 50–75, and 75–100. (Since ranges use "=>" and "<=", they need to overlap.)

Keep in mind that MapInfo Professional may create ranges with no data records, depending on the distribution of your data. For example, if you tell MapInfo Professional to shade the following database according to Equal Ranges:

John	100	Andrea	90
Penny	6	Kyle	1
Miguel	4	Angela	92
Linda	95	Elroy	89
Ben	10	Mark	10

MapInfo Professional creates four ranges (1–25, 25–50, 50–75, and 75–100). Notice, however, that only two of those ranges (1–25 and 75–100) actually contain records.

Natural Break and Quantile are two ways to show data that is not evenly distributed.

Natural Break creates ranges according to an algorithm that uses the average of each range to distribute the data more evenly across the ranges. It distributes the values so that the average of each range is as close as possible to each of the range values in that range. This ensures that the ranges are well-represented by their averages, and that data values within each of the ranges are fairly close together. MapInfo Professional bases its Natural Break algorithm on the procedure described by Jenks and Caspall in their article "Error on Choroplethic Maps: Definition, Measurement, Reduction" from the Annals of American Geographers, June, 1971.

Quantiling enables you to build ranges that determine the distribution of a thematic variable across a segment of your data. For example, you can quantile state population by urban population to illustrate how urban population is distributed across the United States. Your legend will not indicate that you have used Quantile to build your ranges. You can customize the legend so that it shows which field you used to quantile the table.

When you create ranges using **Standard Deviation**, the middle range breaks at the mean of your values, and the ranges above and below the middle range are one standard deviation above or below the mean. You can also define your own ranges using Custom.

The *Help System* contains the following related topics:

- *Creating a Map by a Range of Values*
- *Customizing a Range Map*
- *Customizing the Ranges of a Range Map*
- *Customizing the Styles of a Range Map*
- *Customizing Range Styles and Inflection Points*
- *Customizing the Legend of a Range Map*
- *Modifying a Thematic Map*

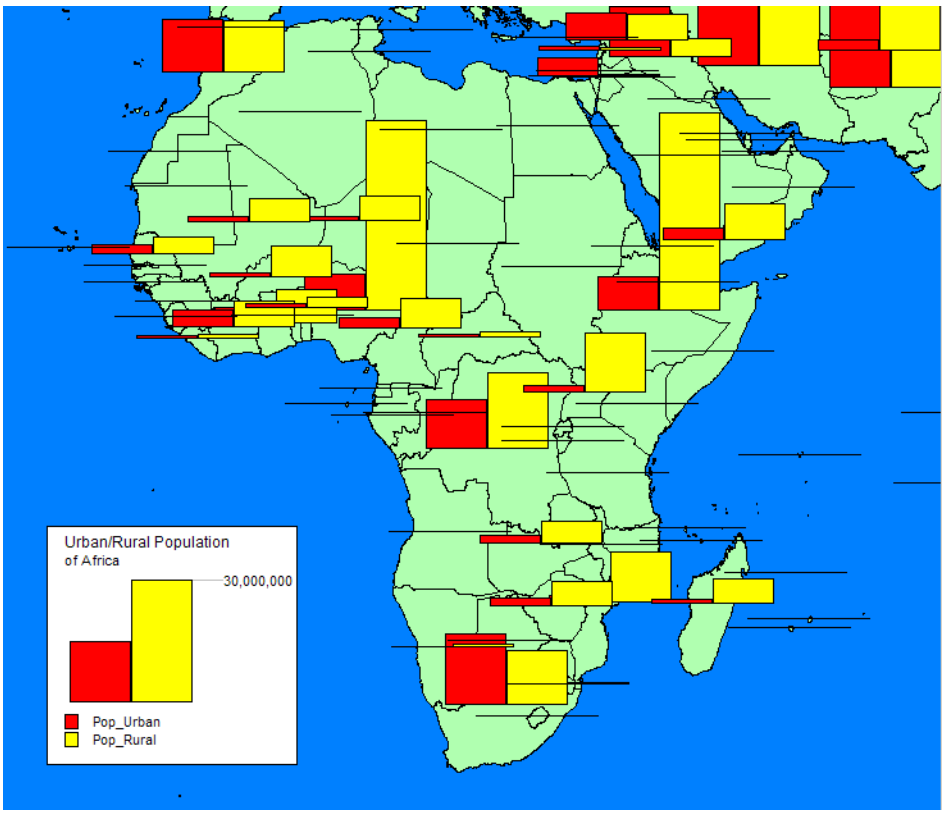
Bar Chart Maps

Unlike thematic maps for single variables such as ranges of values or graduated symbols, a thematic bar chart map allows you to examine more than one variable per record at a time. A bar chart is built for every map object at the centroid of the object, enabling you to analyze the thematic variables in a particular chart by comparing the height of the bars. You can also examine the same variable across all the charts in your map.

You can customize the color of each bar, create a frame around each chart, and fill the empty space inside the frame with a pattern or color. In addition, you can change the bar chart's orientation, such as displaying horizontal bars instead of vertical (the default). You can also control where to display the chart: over the object's centroid (the default) or any of eight other locations.

You can also change the type of bar chart. In our example, you can create a multi-bar chart, where each thematic variable has its own bar, or a stacked bar chart with each thematic variable on top of one another, or a graduated bar chart, where the bars are graduated in size based on some value. You can also scale the bars in a multi-bar chart independently from one another. To show negative values in a bar chart map, the bars extend in the opposite direction to the chart's orientation. Note that negative values do not display in stacked bar charts.

Figure: Bar Chart Map



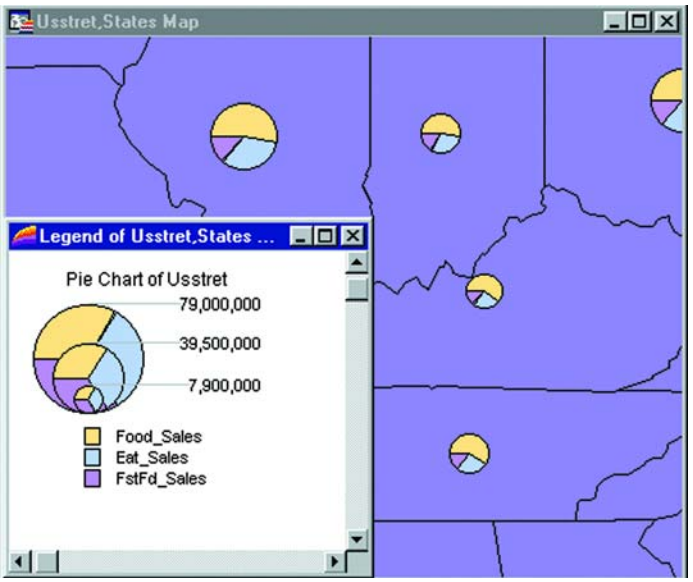
The *Help System* contains the following related topics:

- *Creating a Bar Chart Map*
- *Customizing Bar Chart Styles on your Map*
- *Customizing the Legend of a Bar Chart*
- *Modifying a Thematic Map*

Pie Chart Maps

Thematic maps using pie charts enables you to examine more than one variable per record at a time. Like comparing the height of the bars in bar charts, in pie charts you compare the wedges in a single pie, or examine a particular wedge across all pies. Pie charts enable you to compare parts of a whole.

Both pie and bar charts are particularly useful for analyzing demographic data. For example, you have a table of demographic information for the United States. Your table shows the populations of several major demographic groups. Using pie charts, you can show the population of each demographic group, and see what fraction of the pie it makes up in each pie. This enables you to see the distribution of demographic groups on a per state basis, or across the entire United States. You can also look at one demographic group and see how the population of the group varies in different states. For best results, use no more than four to six pie wedges per pie chart in your analysis.



You can customize the color of each pie wedge as well as the borders of the wedges and the whole pie. You can also specify the angle at which you want to place the first pie wedge, and whether the variables go in a clockwise or counterclockwise direction. Like bar charts, you can also change the pie's orientation. The default is to place the pie over the centroid of the object.

You can choose from graduated pies or half pies. Graduated pies graduate the size of the pies according to the sum of their components. Half pies distribute your data across half a pie instead.

The *Help System* contains the following related topics:

- *Creating a Pie Chart*
- *Customizing a Pie Chart*
- *Customizing the Legend of a Pie Chart*
- *Modifying a Thematic Map*

Graduated Symbol Maps

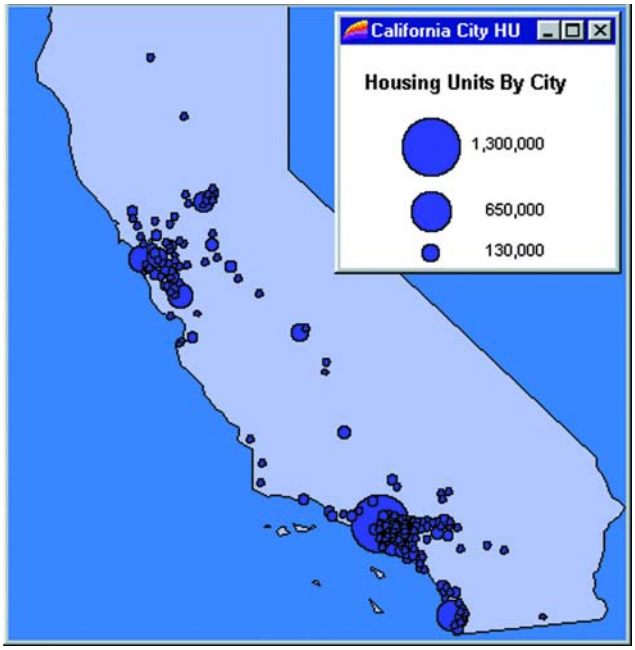
Graduated symbol maps use symbols to represent different values. You can use graduated symbols regardless of the type of map object with which you are working.

For instance, use graduated symbols to show the number of housing units by city. When you select the graduated symbols option, MapInfo Professional varies the size of each symbol according to the value in the sales order field.

You can also represent how much interest each customer has expressed in a given product by assigning a symbol whose size is proportional to the customer's interest.

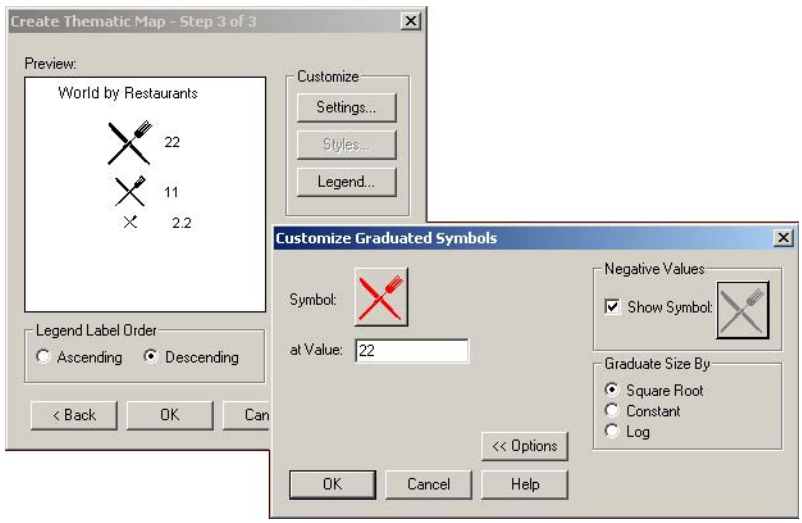
Graduated symbols maps work best when you use numeric data. If you are working with a layer of restaurants, it makes no sense to create graduated symbols based on the type of cuisine each restaurant serves. However, graduated symbols are appropriate when you want to show the number of hamburgers sold at 20 different fast food restaurants.

Figure: Graduated Symbol Map



There are three attributes you can customize on a graduated symbols map: the color, type, and size of the symbol. To change the symbol's attributes in Thematic Step 3 of 3, choose **Customize Settings** and click the symbol icon in the Customize Graduated Symbols dialog box to access the Symbol Style dialog box. The default symbol is a red circle.

Figure: Customize Graduated Symbols



In the Customize Graduated Symbols dialog box, the size of the symbol in the **Symbol** box is the size for the value listed in the at **Value** box. All values between the high value and zero have interpolated point sizes. If you want the symbols at the low end to be larger, increase the point size.

You can also display symbols for negative data values. To change it, click **Options** in the Customize Graduated Symbols dialog box. There is a separate symbol picker so that you can make this symbol as distinct from the symbol for positive values as you want. When you click the icon a different Symbol Style dialog box displays, enabling you to choose a different symbol type, change the color or the size, or change any combination of the three attributes. The default symbol for negative values is a blue circle, and all values between zero and the low value (a negative number) also have interpolated point sizes.

The *Help System* contains the following related topics:

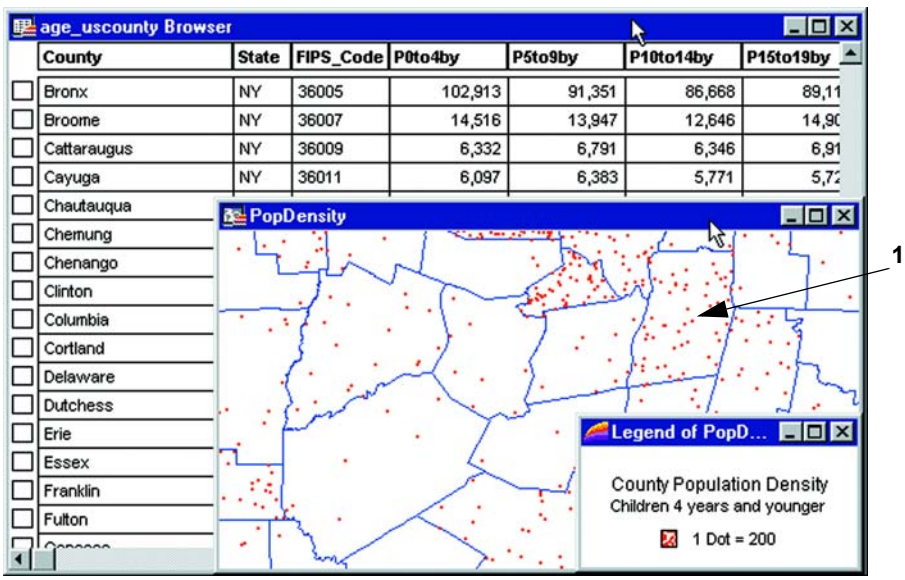
- *Creating a Graduated Symbols Map*
- *Customizing a Graduated Symbols Map*
- *Customizing the Styles of a Graduated Symbols Map*
- *Customizing the Legend of a Graduated Symbols Map*
- *Modifying a Thematic Map*

Dot Density Maps

Dot density maps use dots to represent the data value associated with a boundary or region. The total number of dots in a region represents that region's data value. If you have 10,000 senior citizens in a county, and each dot represents 100 senior citizens, there would be 100 dots in the county boundary.

Dot density is particularly useful for showing raw data where one dot represents a large number of something: population, number of fast food restaurants, number of distributors who carry a brand of soda, etc.

For example, if you have a table of age demographics broken down into postal codes, you could use the dot density option to show the concentration of small children in each postal code boundary.



1 *Rensselaer County*

There are three customizing options for dot density maps. You can specify the value of one dot. For example, you have a table of population statistics, broken down by county. There are 10,000 pre-school students in Rensselaer County, New York. If you display Rensselaer County according to the number of pre-school students using the dot density method, each dot could represent 200 students. In that case, there would be 50 dots in Rensselaer County. You can specify the number of units each dot represents using the Customize Dot Density Settings dialog box.

When you increase the value each dot represents, you decrease the number of dots that display on the map. You could modify your dot density map so that one dot represents 400 students. In that case, there would only be 25 dots in Rensselaer County.

A second option is to change the size of the dots according to your needs, either large or small. If you are working with large populations, or large counts of something, make the dot size smaller so that the distribution of dots is easier to see.

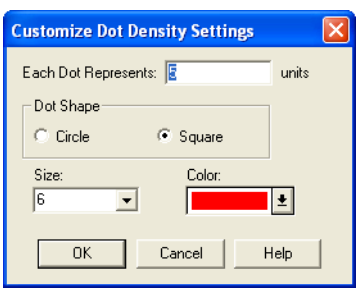
Conversely, if your working with a small data set, making the dot size larger might illustrate your analysis more clearly.

Note: Distribution of dots is random within the region. If you shade states according to population, the dots for New York are spread out throughout the state; they are not concentrated in New York City, where the majority of the state's population lives.

Thirdly, in the Customize Dot Density Settings dialog box, change the color of the dot to either red or black to add more variety to the final map. In this dialog box, you can select Circle or Square dot thematics and specify the dot density width (in pixels) of the square or circle. In general, squares look clearer at small sizes. At larger sizes, it may be more appropriate to use circles. You can create multiple dot density maps on the same layer by varying these options.

In the Creating a Thematic Map - Step 3 of 3 dialog box, select the **Customize Settings** button to display the Customize Dot Density Setting dialog box. Here you can change the number of units that each dot represents, and also select the dot shape (square or circle) size, and color. You can specify a circle size from 2 to 25 pixels in width. For a square, the size can range from 1 to 25 pixels.

Figure: Customize Dot Density Settings



More Dot Density Choices for Thematic Maps

For thematic maps, you can select Circle or Square dot thematics and specify the dot density width (in pixels) of the square or circle. In general, squares look clearer at small sizes. At larger sizes, it may be more appropriate to use circles.

In the Creating a Thematic Map - Step 3 of 3 dialog box, select the **Customize Settings** button to display the Customize Dot Density Setting dialog box. Here you can change the number of units that each dot represents, and also select the dot shape (square or circle) size, and color. You can specify a circle size from 2 to 25 pixels in width. For a square, the size can range from 1 to 25 pixels.

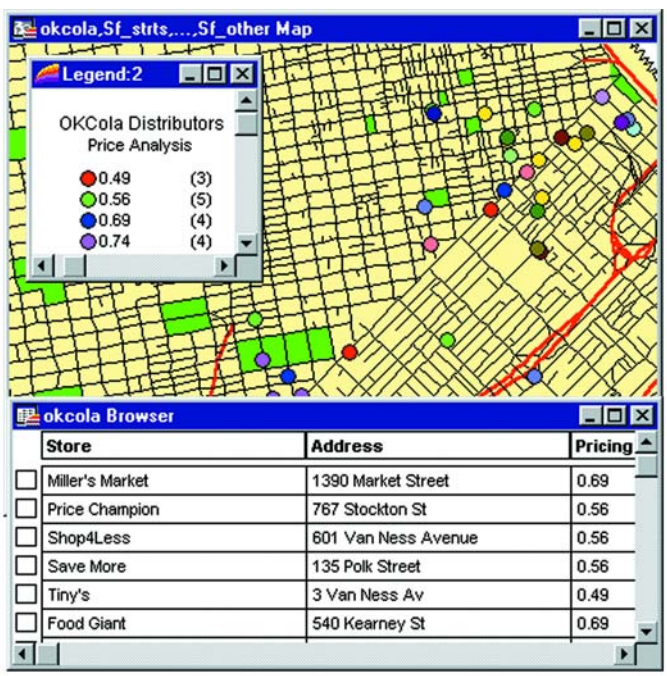
The *Help System* contains the following related topics:

- *Creating a Dot Density Map*
- *Customizing a Dot Density Map*
- *Customizing the Styles of a Dot Density Map*
- *Customizing the Legend of a Dot Density Map*
- *Modifying a Thematic Map*

Individual Value Maps

Individual Value maps show points, lines, or boundaries that are shaded by individual values contained in a particular field. You can use both numerical and nominal values in individual values maps. MapInfo Professional gives each unique value its own color or symbol. When an individual values map uses symbol types, the symbols are taken from the base table.

For example, a soft drink distributor maintains a table of the supermarkets that buy soft drinks from him. Each supermarket sells the distributor's brand of soft drink for a different price. If the distributor shades the supermarket points by price, using individual values, all stores that sell the soft drink for 49 cents are shaded one color, all stores that sell the soft drink for 51 cents are shaded another color, and so on. Each unique value is assigned its own color. The distributor is able to see the price distribution among the supermarkets and can determine where he should increase his sales volume, based on the price.



If you are shading your points, lines or boundaries using nominal data, you can shade *only* by individual values. Nominal data is either non-numerical data (name, type of cuisine served, or brand of automobile sold) or numeric data where the numbers represent non-numeric data like an ID number. Dates are considered numeric data and can be used in both ranged and individual values maps.

For example, you have the results from a consumer survey. One question on the survey reads “What is your favorite Sunday afternoon activity?” The possible responses are:

1. Sleeping
2. Watching TV
3. Taking a drive
4. Reading
5. Playing or watching sports
6. Visiting museums or art galleries
7. Going to the movies

You want to shade each consumer point with the response for the favorite Sunday activity. The SUNDAY column of your table contains the number that corresponds to the consumer’s favorite activity. However, the numbers in this column do not represent quantitative values. Going to the movies is not greater than Playing or watching sports even though 7 > 5. When numbers are used as names instead of values, you must shade your objects by individual values. The numbers are only used to reference the pastimes so color can be assigned to them.

The *Help System* contains the following related topics:

- *Creating an Individual Values Map*
- *Customizing an Individual Values Map*
- *Customizing the Styles of an Individual Values Map*
- *Customizing the Legend of an Individual Values Map*
- *Custom Sort Order for Individual Value Thematic Legends*
- *Modifying a Thematic Map*

Important Notes:

When you are creating and merging theme templates:

- MapInfo Professional saves the custom label order only when the option to **Save Individual Value categories** is selected in the Save Theme to a Template dialog box. This implies that when you create a theme based on a template, MapInfo Professional applies the custom label order only when the thematic expression creates the same categories as those in the template.
- When you are merging theme templates, the custom label order from the source template is applied to the current theme only when the option to **Merge Individual categories** is selected in the Merge a Template to a Theme dialog box and the template and current theme have the same number of categories.
- Saving a Template - The entry for theme templates in the **Options > Preferences > Directories** dialog box allows you to designate the directory where theme templates reside.

- For more information, see *Saving Individual Categories in a Theme Template for an Existing Thematic Map and Saving Individual Categories in a Theme Template when Creating a Thematic Map* in the *Help System*.

Grid Surface Maps

A grid surface theme is a continuous raster grid produced by an interpolation of point data. MapInfo Professional takes a data column or expression from a table and passes those centroids and their data values to an interpolator. The interpolator produces a raster grid file, which appears as a raster table in a Map window.

Grid mapping displays data as continuous color gradations across the map. This type of thematic map is produced by an interpolation of point data from the source table. A grid file is generated from the data interpolation and displayed as a raster image in a Map window.

The *Help System* contains these related topics:

- *Working with Grid Thematic Layers*
- *Spreading Inflections by Equal Cell Count*
- *Modifying a Thematic Map*

Creating a Thematic Map

There are many kinds of thematic maps, but the process for creating each type of map is the same. In this section, we cover the creation of thematic maps in general terms. You can find more specific instructions for creating specific types of thematic maps in the Help System.

Step 1: Choosing a Type of Thematic Template

Templates allow you to make a thematic map based on values and settings. In our default types, you can alter these settings and/or save them as a new template you can use again. When you first create a thematic map, you select a template that you can modify to suit your requirements. You cannot create a theme without using an existing theme template.

Template Sort by Name
Displays available templates in alphabetical order according to their name.

Template Sort by Time
Displays available templates according to the time they were created or last modified.

Preview Legend Sample (Template Type)
Displays a sample legend for the template type.

Use Customized Legend Text
Displays customized text for the legend. If enabled, the template has custom titles or range labels. Check to use the custom text.

Cancel Button
Cancels the options dialog box and returns to the map.

Next Button
Continue to next step.

Range Template
Displays your data according to the ranges you set. Ranges are shaded with colors and/or patterns. Choose from templates displayed as shaded lines, points or regions. Ranged thematic maps allow you to illustrate data values across points, lines and regions. They are used to show a relationship between the data values and geographical area (e.g. sales figures, household income) or to present ratio information such as population density (population divided by area). Ratio information can be shown in other types of thematic maps when you choose Expression in Step 2.

Bar Chart Template
Displays a bar chart of your thematic variables for each record in your table. Use bar charts to analyze multiple variables per record on the map. Make comparisons between the size of the bars in each chart to obtain information about a record in the table set, or compare one bar in all the bar charts to draw conclusions about a variable across all of the records, or compare the height of the bar charts to obtain information about the entire table. To indicate a negative value in a bar chart, bars extend in the direction opposite to the charts orientation. Negative values do not display in stacked bar charts.

Pie Chart Template
Displays a pie chart of your thematic variables for each record in your table. Pie charts are multi-variable. Use pie charts on the map to analyze more than one variable at a time. You can compare the size of the pie wedges in each chart to obtain information about a record in the table, or compare one pie wedge in all of the pie charts to draw conclusions about a variable across all the records, or compare the diameter of the pie charts to obtain information about the entire data set.

Graduated Template
Displays a symbol for each record in your table, the size of which is directly proportional to your data values. A graduated symbol map shows data points with specific numerical values. It is useful for illustrating quantitative information, such as high-to-low rankings. The size of the symbols is proportional to the data values of the points. Points that have larger data values appear larger, and points that have smaller data values appear smaller.

- For instructions on creating a Graduated Symbols thematic map, see *Creating a Graduated Symbols Thematic Map* in the *Help System*.

Dot Density Template
Displays the data values as dots on your map, where each dot is equal to a number, and the total number of dots in a region is proportional to the data value for that region. A dot density map allows you to examine raw counts of data (e.g. population). Each dot represents a number of units. That number, multiplied by the total number of dots in the region, equals the data value for that region.

- For instructions on creating a Dot Density thematic map, see *Creating a Dot Density Thematic Map* in the *Help System*.

Individual Values Template
Shades records according to individual data values. Individual value templates are multi-variable. Choose from shaded lines, points or regions. A thematic map that draws map objects according to individual values is useful when you want to emphasize categorical differences in the data rather than show quantitative information (e.g. types of stores in a given area, zoning classifications in a given area etc.).

- For instructions on creating a Individual Values thematic map, see *Creating an Individual Values Thematic Map* in the *Help System*.

Grid Template

Grid mapping displays data as continuous color gradations across the map. This type of thematic is produced by an interpolation of point data from the source table. A grid file is generated from the data interpolation and displayed as a raster image in a Map window.

Step 2: Choosing Thematic Values

Choose the map layer on which you want to base the map, and the field or expression from which you want to obtain the data values (thematic variable).

A thematic variable can be the data value that is associated with the graphic objects (regions, lines, and points) displayed in your map, such as the values in a column like Pop_1990, Buy_Power, or Median Age.

You can also obtain your thematic variable from another table using Table > Update Column. Update Column creates a temporary column in your base table where you can aggregate or calculate information about your data.

You can also use an expression for your thematic variable. For example, you could use the following expression to display population density:

```
Pop_1990/Area(obj, "sq mi")
```

You can access the Expression dialog box in Step 2 of creating a thematic map. See the Help topics, Using Expressions in a Thematic Map and Creating Expressions for more information.

Your map may have more than one variable, depending on the thematic method you choose. Pie and Bar chart maps contain more than one variable; the other five types of thematic maps contain one variable. Depending on your choice of a one-variable or multi-variable thematic map, one of two Create Thematic Map- Step 2 of 3 dialog boxes displays.

One-Variable Thematic Maps

Ranged, graduated symbol, dot density, individual value, and grid thematic maps examine one variable. The Create Thematic Map - Step 2 of 3 dialog box that displays for these kinds of maps asks you to choose only a table and one field or expression.

1. Choose a table from the **Table** drop-down list. The drop-down list displays the tables that are mapped in the active Map window.
2. Choose the table on which you want to base the map.

   If you have objects selected in the Map window, the Selection from TABLE item also displays in the list. This enables you to create a thematic map based on the selected items without having to map the selection. You can also base your thematic map on a mapped query table.
3. Choose a field from the **Field** drop-down list. The drop-down list displays all the numeric fields in the table you selected from the **Table** list. Choose the field or expression that contains the data values.

4. Select the **Ignore Zeroes or Blanks** check box to ignore zero values and blank values in the table. Because you are creating a thematic map based on one field in a table, any zero or blank values in that field will cause the whole record to be ignored. If you are creating a grid map, you can choose a table of regions to clip the grid against.
5. Choose **Next** to go on to **Step 3 - Customizing Your Thematic Map**.

Multi-Variable Thematic Maps

Pie and Bar Chart thematic maps allow you to analyze more than one variable at a time. In the Create Thematic Map - Step 2 of 3 dialog box, you choose the fields or expressions you want to use as the variables, and list them in an order that best suits your analysis. You can use up to 8 variables in a bar or pie chart thematic map.

To create a multi-variable thematic map in the Create Thematic Map - Step 2 of 3 dialog box:

1. Choose the table on which you want to base the map from the **Table** drop-down list. The drop-down list displays the tables that are mapped in the active Map window.

   If you have objects selected in the Map window, the Selection from TABLE item also displays in the list. This enables you to create a thematic map based on the selected items without having to map the selection.

   Fields from TABLE displays all the numeric fields in the table you selected from the Table list.
2. Choose the field, or create an expression that contains the data values.

   Fields for Pie/Bar Chart indicates the fields or expressions you have chosen for your pie or bar chart thematic map. The order of the variables in the **Field for the Pie/Bar Chart** list is the order in which the variables appear in the legend.

   - For bar chart thematic maps, the order in which the variables display in the legend is the order in which the bars display from left to right on the map.
   - For pie chart maps, the first variable in the legend corresponds to the pie wedge that begins at the angle specified in the Customize Pie Style dialog box.
3. To display the Customize Pie Style dialog box, click Styles in the Create Thematic Map - Step 3 of 3 dialog box.
   - Click **Up** to move the selected field or expression up one place in the **Fields for Pie/Bar Chart** list. **Up** is unavailable when the selected item is the first item in the list.
   - Click **Down** to move the selected field or expression down one place in the **Fields for Pie/Bar Chart** list. **Down** is unavailable when the selected item is the last item in the list.
   - Click the **Right Arrow** button to move the selected field in the **Fields from TABLE** list to the **Fields for Pie/Bar Chart** list.
   - Click the **Left Arrow** button to move the selected field in the **Fields for Pie/Bar Chart** list to the **Fields from TABLE** list.
4. Choose **Next** to go on to Step 3.

Step 3: Customizing Your Thematic Map

The last step allows you to customize your thematic map, or create the map based on the default settings. You can also preview the map's legend before you display the map, and change the legend's label order. Use these features:

Preview Legend Sample (Thematic Map)
Displays a sample legend of the thematic map you are creating.

Customize
The buttons in the Customize group enable you to change the default settings of particular aspects of your thematic map. For more information see the Help topic, Modifying A Thematic Map.

Settings
Allows you to customize settings on a ranged map. This option is available for ranged and grid maps.

Styles
Enables you to customize style attributes such as color and size. This option is available for ranged, pie, bar, and individual value maps.

Legend
Enables you to customize your legend. This option is available for all types of thematic maps. For instructions on this process, see the *Customizing the Legend of a Thematic Map* topic in the *Help System*.

Number of Columns
Use this field to indicate the number of columns in which you want the legend entries to display.

Legend Label Order
Determines the order in which range and value labels (for ranged and individual values maps) and field labels (for all other thematic maps) appear in the legend. If you are creating a ranged map, the order you specify is also shown in the Customize Range Styles dialog box. Use these entries to indicate whether the legend entries should display in **Ascending** or **Descending** or alphabetical order. Click **Custom** to select a custom label order and to enable the **Order** button.

Order
Use this button to display the Customize Legend Label Order dialog box. Here you can click an entry in the list and use the **Move Up** and **Move Down** buttons to properly position the label entries until they are in the order you want. Click **OK** to save the custom order.

Associate Theme with Table
The options you select in this group determine the default theme display for the current map.

Save As Default Theme View
Use this check box to save this theme to the map’s metadata so that the theme you have chosen displays each time you open the map.

Note: To ensure that this feature works, you must set the **Automatically Open Default Theme** option in the Map Window Preferences dialog box.

Remove Default Theme View
Use this check box to remove the saved default theme from the map’s metadata.

Template

The buttons in the Templates group enable you to specify a name for a template, save the thematic map as a template, and when modifying an existing theme merge the thematic map with another template.

Save As

Displays the Save Theme to a Template dialog box. Type a unique name or select an existing name and overwrite it. If you overwrite an existing template, you are prompted to confirm this action.

Merge

The **Merge** button is enabled only when you are modifying an existing theme, not when you are creating a thematic map.

When you click **OK** a thematic map is created based on either the default or customized settings.

Customizing the Legend of a Thematic Map

To customize the legend for a thematic map, choose the **Legend** button in the Create Thematic Map - Step 3 of 3 dialog box. It displays the Customize Legend dialog box where you can customize the legend's title, subtitle, fonts, or range labels. You can also specify if you want to display a legend for this thematic layer.

- For more information, see *Customizing the Legend of a Thematic Map, Showing or Hiding a Legend,* and *Deleting a Frame from a Legend* in the *Help System*.

Saving a Theme to a Map Window

To save a thematic map to a Map window's table, you must select the **Automatically Open Default Theme** check box in the Map Window Preferences dialog box.

- For more information, see *Saving a Theme to a Map Window* in the *Help System*.

Thematic Maps as Layers

If you have created a thematic map, it will be listed in **Map > Layer Control** as a separate layer. Thematic layer names are indented and display above their corresponding data layers in the layer list. You can modify the attributes of the thematic map through **Layer Control**.

Note: A Grid thematic layer *will not* be indented in the Layer Control dialog box; a grid thematic layer is a read-only layer.

To modify the attributes of a thematic Map:

1. Choose **Map > Layer Control**. The Layer Control dialog box displays.
2. Choose the thematic layer.
3. Click the **Thematic** button at the side of the Layer Control dialog box. The Modify Thematic Layer dialog box displays.

4. Change the thematic settings, style, or legends from this dialog box.

   Note: The availability of certain dialog boxes depends on the type of thematic map you are altering.

   For a full discussion of altering thematic maps, see **Modifying a Thematic Map on page 362**.

Changing the Display Parameters of a Map

Changing a Map's Proportions

When you want to change the proportions of a map, resize the original Map window. MapInfo Professional automatically transmits that change to the layout frame. You cannot change a map's proportions by moving the edges of the frame over the map. MapInfo Professional simply resizes the map, preserving its view.

Changing Your View of a Map

You change a map's zoom level by specifying certain parameters in the Change View dialog box.o change a map's zoom level do one of the following:

- Choose **Map > Change View**. The Change View dialog box displays.
- Click the **Change View** button on the **Main** toolbar. The Change View dialog box displays.

The Change View dialog box allows you to set various parameters of the map including:

- Display the current zoom, scale or cursor position in the status bar (the default unit of distance is **miles** which is specified in **Map > Options**).
- Change the zoom, scale, and the center point of the current map view.
- Behavior of the map when you resize the window.
- Resize the map to fit the new window, keeping the view the same.
- Set the map to preserve the current scale, so that resizing the window has the effect of letting you see more or less of the map.

Resetting the Map Scale

You can use a frame's Frame Object dialog box to size the map so that it has a specific scale. For example, when you want one inch to equal 50 miles, type 50 into the Scale box, the map is rescaled so that one inch on the Layout page equals 50 miles.

This example assumes the map distance units are in miles and the Layout paper units are in inches.

To reset the map scale:

1. Click the layout, making it the active window.
2. Double-click the map frame to bring up the Object Frame dialog box.
3. Set the map scale to the desired value.

Working with Thematic Maps and Legends

This section covers changing and saving thematic map information and thematic legends.

Modifying a Thematic Map

Once you create your theme, it is likely that you will want to change something about it. MapInfo Professional provides two ways to reach the Modify Thematic Map dialog box where you can customize a variety of settings, styles, and legend components.

To modify a thematic map, do one of the following:

- On the **Map** menu, click **Modify Thematic Map**
- Double-click the theme's legend frame within the legend window to display the dialog box.

When you are modifying a map, a quick way to change a number of settings at once is to change the template of the current theme.

To merge a template into your current map:

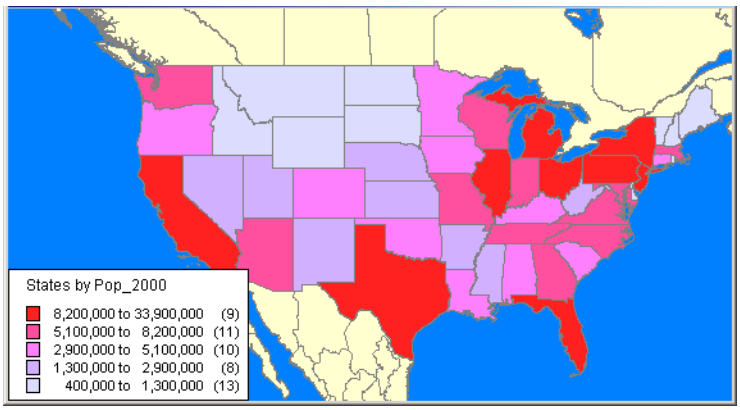
1. On the **Map** menu, click **Modify Thematic Map** to display the Modify Thematic Map dialog box.
2. In the Modify Thematic Map dialog box, click the **Merge** button in the Templates group. The Merge a Template into the Current Theme dialog box displays with a list of the same type templates as your theme (all range of values templates, for example.)
3. Choose the new template and click **OK** to return to the Modify Thematic Map dialog box.
4. Click **OK** again to display the map with the new thematic template. The settings in this template will be applied to your theme.

The Merge feature is only available once you have created the thematic map.

Using the Theme Templates

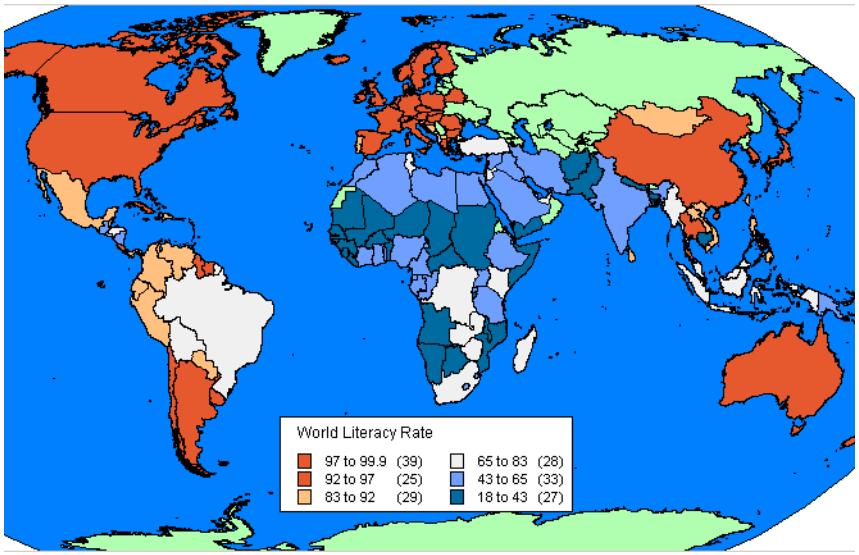
You can use the theme templates for region ranges, region individual values, point ranges, and grid elevations. Some of the new region range templates are *sequential* (variations on a particular color to show intensity), and some are color *diverging* (starting with one color and moving to other complementary colors) and each has its purpose. *Sequential templates* are helpful when you are showing a progression of data, that is, when the data is straight forward. An example might be population.

Figure: Sequential Template Example



Diverging templates are useful when showing data that diverges more dramatically. An example might be world literacy rates:

Figure: Divergent Theme Example



The areas in green are areas we do not have data for.

Saving Your Thematic Settings

MapInfo Professional provides a way to save your themes and the templates from which you created them.

Saving Thematic Map Layers

To save your thematic maps, on the **File** menu, click **Save Workspace**. A workspace is a listing of all the tables and settings used in a map. When you open the workspace, MapInfo Professional opens the tables and re-creates the thematic map. If you close a table or Map window without saving

your session to a workspace, MapInfo Professional displays the Save Map Objects dialog box and prompts you to do so. The dialog box indicates what types of objects will be lost (for example, thematic layers, label layers) if you do not save your session to a workspace. You can turn off the warning prompt in Map Window preferences.

Saving Thematic Templates

Every thematic map begins with a template from which you can then customize for your particular needs. These settings can be saved for future use. In the Create Thematic Map – Step 3 of 3, choose the **Save As** button in the **Template** group box. The Save Theme to a Template dialog box displays. To save your new settings to the existing template, click **OK**. To retain both the new and the original template, type a different name into the Name field. To recover any template that ships with MapInfo Professional, copy it from the \THMTMPLT directory on the product CD. Templates have the extension .THM. In MapInfo Professional files are stored on a per-user basis.

For individual value themes you can also save the actual categories in a theme template. For example, if you choose to build an individual value theme on a table to show land usage, you can assign a different region style to each type of land usage (commercial, forest, residential, farm land etc.). You may then want to take those same assignments and apply them to another table. You can do this by storing the category in a template, it will be associated appropriately when the template is applied to the second table.

To save individual categories in a theme template when creating a new thematic map or for an existing thematic map, from the Modify Thematic Map dialog box press the **Save As** button and specify a template Name. Check the **Save Individual Value Categories** box and click **OK**. A template is saved that can be used to apply the stored individual categories to a second table. When you choose **Map** menu and click **Create Thematic Map** the template's name will appear in the Template Name field of the Create Thematic Map - Step 1 of 3 dialog box.

Creating a Theme Legend

To create a theme legend:

1. Display a thematic layer.
2. Choose **Map > Create Legend**. The Create Legend Step 1 of 3 dialog box displays.
3. Proceed to the Create Legend Step 3 of 3 dialog box.

   Only title/subtitles can be set for theme frames. If a theme layer is selected, the title/subtitle currently set for the thematic legend displays; you may edit these.

   The other options are not available. Changing a theme legend's title/subtitle affects all occurrences of the thematic legend. Additionally, fonts designated in Step 2 of 3 are not be applied to thematic legends.

Using Theme Legends in the Cartographic Legend Window

To use a theme legend in the Cartographic Legend window:

1. Make a thematic map the active Map window and choose **Map > Create Legend**. The Create Legend Step 1 of 3 dialog box displays.
2. Select the thematic layer as one of the legend frames you want to include in the legend. Select any other layers you want to include. Click **Next**. The Create Legend Step 2 of 3 dialog box displays.
3. Fill in the Legend Properties and Legend Frame defaults. Click **Next**. The Create Legend Step 3 of 3 dialog box displays.
4. Select the theme frame to edit the title and subtitle(s). Click **Finish** when you are ready to display the legend.

Only title/subtitles can be set for theme frames. If a theme layer is selected, the title/subtitle currently set for the thematic legend displays; you may edit these. The other options are not available. Changing a theme legend's title/subtitle affects all occurrences of the thematic legend. Additionally, fonts designated in Step 2 of 3 will not be applied to thematic legends.

Updating Columns using Thematic Mapping

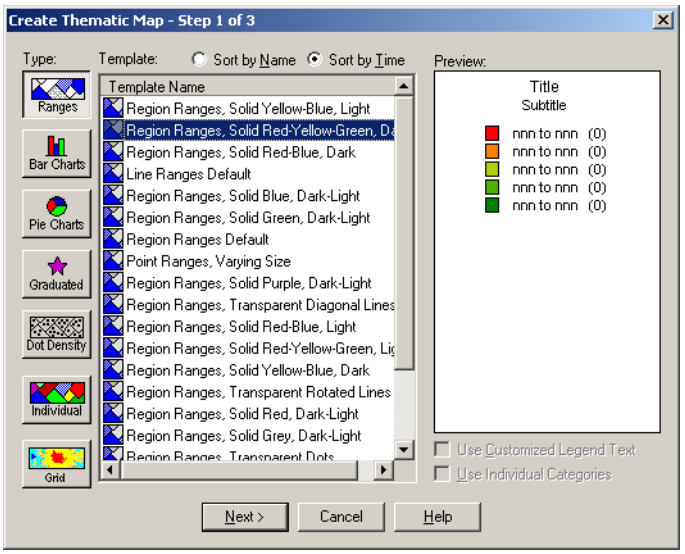
As explained earlier in this chapter, you can use data from another table to construct your thematic map using Update Column. Update Column creates a temporary column in your base table and automatically inserts data into it for your map. This data can be a field taken directly from another table, or aggregated from other data.

For example, you have a table of U.S. state boundaries and a table of U.S. city point locations. Using ranges of values you want to shade the STATES table according to the percentage of each state's population living in urban areas. For MapInfo Professional to calculate this percentage, the population for the cities must be in the STATES table.

Note: Some of the files used in this example may be from the MapInfo Professional Tutorial data and is only available from the MapInfo web site, www.mapinfo.com/miprotutorial.

To create a temporary column using Update Column:

1. Open the base table (STATES.tab) and the city table (CITY_125.tab).
2. On the **Map** menu, click **Create Thematic Map**. Create Thematic Map Step 1 of 3 displays.



3. Choose **Ranges** and select a template name from the list. This is the style of the thematic map you are creating. Click **Next** to display the Create Thematic Map Step 2 of 3 dialog box.

4. Choose **STATES**, since this is the table you want to shade and in the **Field** drop-down list, choose **Join**. The Update Column for Thematic dialog box displays.

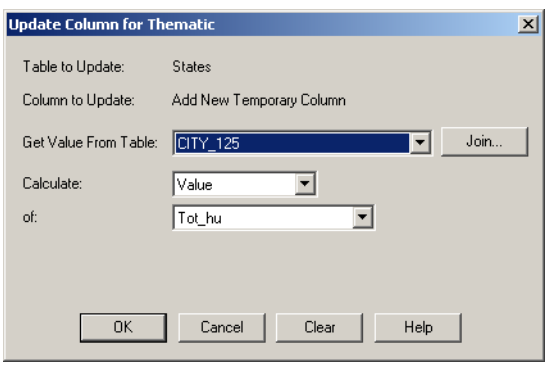


Table to Update is already set to STATES and Column to Update is automatically set to **Add new temporary column**.

5. Select the **CITY_125** in the Get Value From Table box. If that is the only other table open, MapInfo Professional automatically displays its title in the list box.

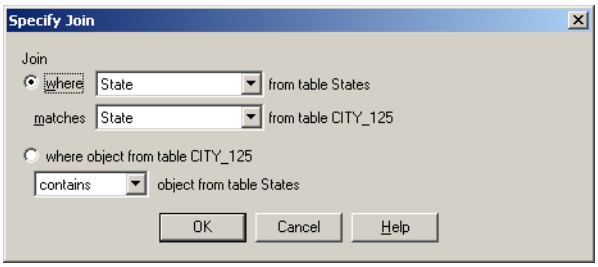
   Note: When you create a temporary column for a thematic map, the field must be a numeric field. This is true for all thematic maps except individual values.

   Since in our example, we are looking for the percentage of the population living in urban areas in the United States, we need to calculate the total of the CITY_125 population; that is, we must calculate the total of the population of each city in a each state. We need to put that sum into the temporary column.

6. In the Calculate box choose **Sum**. In the of box, choose **Tot_pop**.

   To put the data from the CITY_125 table into the temporary column of the STATES table, there must be a link between the two tables that MapInfo Professional can use to access the data. MapInfo Professional can often make this link automatically. In this example, both our tables have a **State** field.

7. Click **Join** to display the Specify Join dialog box.

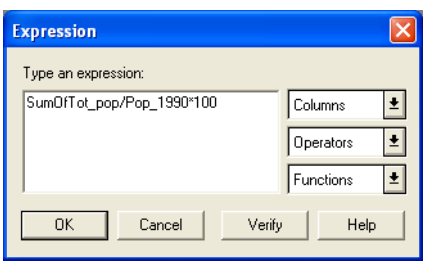


   When you choose **Join** in the Update Column for Thematic dialog box, you can see that MapInfo Professional has already set up the Specify Join dialog box with the STATE fields from both tables. If the join were not calculated automatically it would be necessary to specify the matching fields or geographic join.

8. Choose **OK**. MapInfo Professional calculates the sum and returns you to the Thematic – Step 2 of 3 dialog box. The **Field** list box displays the temporary column you created: SumOfTot_pop.

   However, before we create the map, we still need to calculate the percentage of the total population of each state that is urban. That information does not exist as a field in the table, so you must build an expression to generate it.

9. In the **Field** drop-down list, select **Expression**. The Expression dialog box displays.

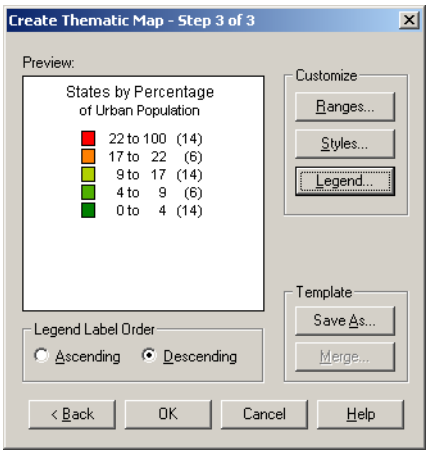


*The expression SumOfTot_pop/Pop_1990 * 100 will give you the answer as a percent.*

10. In the Type an expression box, type:

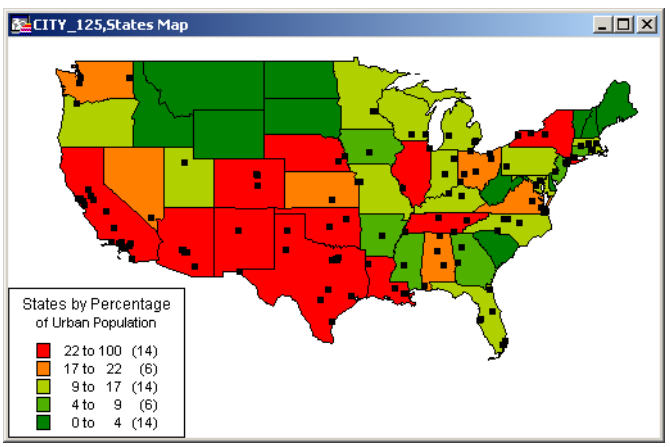
```
SumOfTot_pop/Pop_1990*100
```

11. Choose **Verify** to ensure that your syntax is correct, and then choose **OK**. The Create Thematic – Step 2 of 3 dialog box redisplays showing the expression you created. Choose **Next** to go on to the Create Thematic Map Step 3 of 3 dialog box.



12. Click the **Ranges** button and choose either **Equal Count** or **Equal Ranges** to customize the ranges, whichever gives you the best representation of your data. Use Round By to round to a decimal place or whole number. Customize the styles to best illustrate your analysis by clicking the **Styles** button. Customize your legend by clicking the **Legend** button.

13. Click **OK** to display your map in a Map window.



For details about using point or line objects to represent thematic variables, see *Bivariate Thematic Mapping* in the MapInfo Professional *Help System*.

Adding Temporary Columns

Use Update Column to add temporary columns to a table by using data from another table.

To add a temporary column:

1. Open at least two tables.
2. Choose **Table > Update Column**. The Update Column dialog box displays.
3. Choose the table to which the temporary column will be added in the **Table to Update** list.

4. Choose the table from which MapInfo Professional will retrieve the update information in the **Get Value from Table** list.
5. To add a temporary column, select the **Add new temporary column** option from the **Column to Update** list.

   If necessary, specify the information MapInfo Professional will need to associate the data (join) in the two tables by using their common tabular or graphic data.
6. Choose how to produce the column data by specifying how to calculate the information based on columns and expressions at the **Calculate** and **of** lists.
7. Select the **Browse Results** check box to display the table with its new temporary column in browser format.
8. Click **OK**. The temporary column is added based on the specified information.

   When you make changes to the data table, the new temporary column is automatically updated.

   To save the table with its new temporary columns, use **File > Save As**. If the temporary columns are added to a table in a workspace, the changes are automatically saved when you save the workspace.

The Help System contains the following topics about *Bivariate Thematic Mapping:*

- *Types of Bivariate Maps*
- *Creating a Transparent Bivariate Layer (Ranged Theme)*
- *Creating a Transparent Bivariate Layer (Individual Value Theme*
- *Setting the Default Behavior of the Replace Layer Style Check Box*
- *Example of Bivariate Thematic Mapping*
- *Using an Inflection Point to Show Distinction*
- *Example of an Inflection Point Map*
- *Controlling the Number of Inflection Values*
- *Applying Rounding Factors to Inflection Values*
- *Spreading Inflections by Equal Cell Count*

Working with Legends

Legends are an important part of making your map understandable to your audience. In MapInfo Professional, you can create two kinds of legends: cartographic and theme legends. Theme legends are those associated with thematic maps. Cartographic legends enable you to create a legend for any map layer(s) in your Map window. The combination of the two types makes it possible to provide cartographic data for all of your map layers.

Creating a Legend Window

You can create a Legend window based on layers in the active Map window.

- The *first dialog box* allows you to select the layers that will appear in the legend window
- The *second dialog box* allows you to set options for each frame in the legend window

- The *third dialog box* allows you to create attribute driven legends, save frame settings to metadata, create the Legend with joined information.

To create a legend window:

1. Choose **Map > Create Legend**. The Create Legend - Step 1 of 3 dialog box displays.

   The primary function of this step is to choose the layers that will contribute to the legend. The legend will have one frame for each layer that appears in the destination list box "Legend Frames". By default, all layers that can contribute to the legend will appear in the “Legend Frames” list box. The frames will be drawn in the order which they appear in the list, so Up and Down buttons are provided for reordering.

   By default, all layers are selected and appear in the **Legend Frames** list box. If you want to choose specific layers for the cartographic legend you are creating use the **Remove** button to move the layer name to the **Layers** list box. Any layer you move to the **Layers** list box will not be included in the legend.

   Note: A layer must contain style attributes to appear in the list box; therefore raster layers are not included in the list box.

2. Complete the Create Legend - Step 1 of 3 dialog box selecting the layers that will contribute to the legend. Press the dialog box’s **Help** button for specific dialog box field information.

3. Do one of the following:

   - Choose **Finish** and a legend is created using one frame for each layer listed in the **Legend Frame List** box.
   - Choose **Next** to display the Create Legend - Step 2 of 3 dialog box.

4. Specify the legend properties and legend frame defaults. Press the dialog box’s **Help** button for specific dialog box field information.

5. Do one of the following:

   - Click **Finish** to display the legend.
   - Choose **Next** to display the Create Legend - Step 3 of 3 dialog box.

   You can create legends based on unique map styles, or by unique values in an attribute column. Text descriptions can be generated from attribute columns and/or expressions. Additionally, the process by which the legend was generated can be saved to the map table metadata as a default that will be invoked when the legend is next created. The metadata defaults are used to initialize the Create Legend Step - 3 of 3 dialog box. Override metadata defaults and select your own settings in the dialog box and save your changes by writing them to the map table metadata

6. Complete the Create Legend - Step 3 of 3 dialog box attributes for each Legend Frame. Click **Finish** to display the legend.

- For more specific information, see *Creating a Legend Window* and *Modifying the Legend Window Properties* in the *Help System*.

You can save the Legend window to the map table metadata as a default that will be invoked when the legend is next created. The metadata defaults are used to initialize the Create Legend Step 3 dialog box. To override metadata defaults, select your own settings in the dialog box and save your changes by writing them to the map table metadata.

What are Cartographic Legends?

Cartographic legends display cartographic data for a map layer. A legend is created for each layer in your Map window that you choose to include in the legend. Cartographic legends can be displayed in a layout, expanding MapInfo Professional's presentation capabilities. You can create a legend for an individual layer, giving it particular emphasis, or you can place legends for several layers in one legend window. You can also customize many elements of the cartographic legend and the legend window, including the window title, legend frame borders, and the legend title and subtitle.

Here is a brief description of how to create a cartographic legend:

1. On the **Map** menu, click **Create Legend**. The Create Legend – Step 1 of 3 dialog box displays.
2. Select the layers you want to use in the legend and click **Next**. The Create Legend – Step 2 of 3 dialog box displays.
3. Specify the legend properties and legend frame defaults and click **Finish** or click **Next** to select and set attributes for each legend frame.
   - If you click **Finish**, your legend displays.
   - If you click **Next**, the Create Legend – Step 3 of 3 dialog box displays.
4. Specify the legend frames and give titles to them in the fields provided and click **Finish** to display your legend. For more details on the options available in the cartographic legend feature, see **Creating a Cartographic Legend on page 422** or see *About Cartographic Legends* in the *Help System*.

Customizing a Thematic Legend

To customize the legend for a thematic map, choose the **Legend** button in the **C**reate Thematic Map - Step 3 of 3 dialog box. It displays the Customize Legend dialog box where you can customize the legend's title, subtitle, fonts, or range labels. You can also specify if you want to display a legend for this thematic layer.

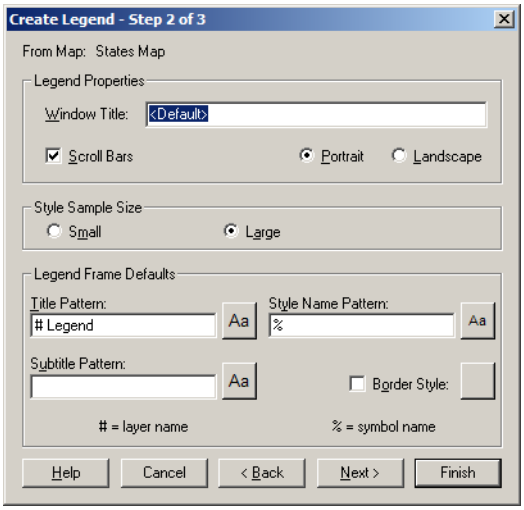
To customize a legend:

1. Choose **File > Open**.
2. Choose the map tables with which you want to work.
3. Choose **Map > Create Thematic Map** to display the Create Thematic Map - Step 1 of 3 dialog box.
4. Choose one of the thematic style buttons and choose **Next**. The Create Thematic Map - Step 2 of 3 dialog box displays.
5. Choose the table on which you want to base the shading, and choose the fields or expressions containing the data values. Different prompts display depending on what type of thematic map you selected.
6. Choose **Next**. The Create Thematic Map - Step 3 of 3 dialog box displays.
7. Choose **Legend** to display the Customize Legend dialog box.
8. Choose the items you want to customize and make the desired changes.

- For specific instructions, see *Customizing a Thematic Legend* and *Displaying or Hiding a Floating Thematic Legend* in the *Help System*.

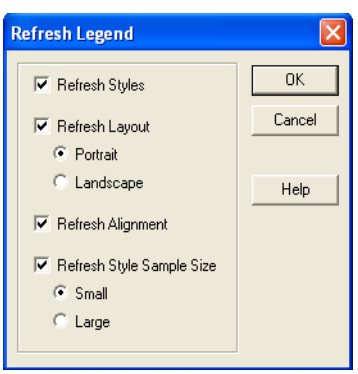
Selecting the Sample Size for a Cartographic Legend Window

You can control the sample legend sizes that appear in Cartographic Legend windows. This feature does not affect Thematic Legend windows. When creating Legends, the Create Legend window - Step 2 of 3 dialog box allows you to select a **Small** or **Large Style Sample Size**. When adding frames to a Legend window, the style sample size is indicated. The default is **Large**.

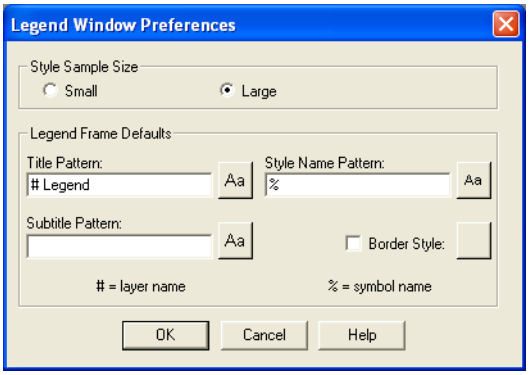


To change the style sample size of an existing Cartographic Legend window:

1. From the **Legend** menu, select **Refresh** to display the Refresh Legend window.
2. Select **Refresh Style Sample Size** and select either **Small** or **Large**.
3. Click **OK** to refresh the legend.



You can also change the default value for style sample size shown in **Create Legend - Step 2 of 3**. In the Legend Preferences window (**Options** > **Preferences** > **Legends**), select either **Small** or **Large Style Sample Size**. The initial default is **Large**. After changing the preferences, you can Refresh Styles through the user interface.



- For more information, see *Metadata Support for Cartographic Legends* in the *Help System*.

What are Thematic Legends?

Theme legends are created automatically when you create a thematic map. They provide a key of the colors, symbols, and styles used in the map. Their display is controlled via the **Show/Hide Theme Legend Window** command in the **Options** menu. Use the appropriate command in the **Map** menu to modify them (on the **Map** menu, click **Modify Thematic Map**), or simply double-click the legend to display the Modify Thematic Map dialog box. If a theme legend is part of a cartographic legend, and you click it to modify it, the Modify Thematic Map dialog box displays. Click the **Legend** button to modify the legend. For more on theme legends and thematic mapping, see **Using Thematic Mapping to Analyze Information in Chapter 10 on page 340**.

Aligning Thematic Legends and Legend Frames

You can align frames in a thematic legend and align titles within frames in a thematic legend. Additionally you can align titles and labels in both cartographic and thematic frames in the same way.

The Help System contains these related topics:

- *Selecting Column Alignment Options within a Legend Window*
- *Changing the Number of Columns in a Legend Frame*
- *Selecting Thematic Legend Swatch Sizes*
- *Selecting a Custom Sort Order for Individual Value Thematic Legends*
- *Creating Custom Labels for Legends*

Important Notes for Creating and Merging Theme Templates:

When you are creating and merging theme templates:

- MapInfo Professional saves the custom label order only when the option to **Save Individual Value categories** is selected in the Save Theme to a Template dialog box. This implies that when you create a theme based on a template, MapInfo Professional applies the custom label order only when the thematic expression creates the same categories as those in the template.

- When you are merging theme templates, the custom label order from the source template is applied to the current theme only when the option to **Merge Individual categories** is selected in the Merge a Template to a Theme dialog box and the template and current theme have the same number of categories.
- For more information, see *Creating Custom Labels for Legends* in the *Help System*.

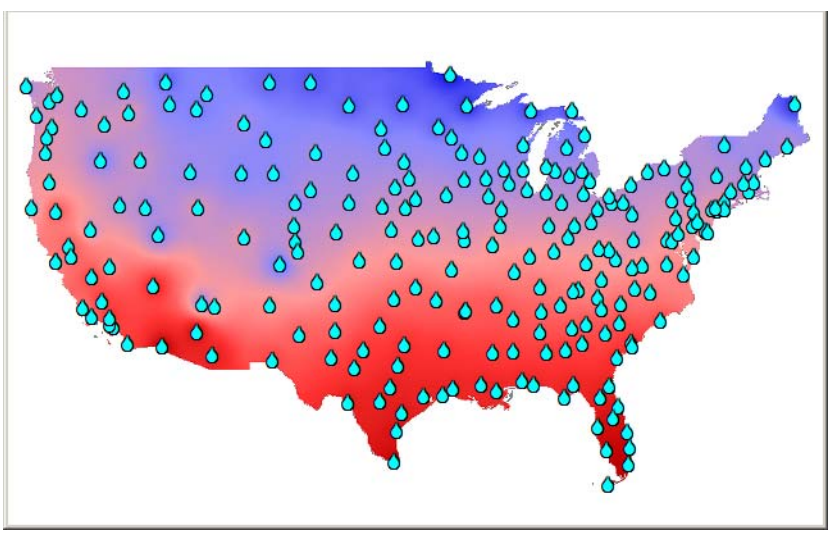
Working with Grid Surface Maps

The thematic maps we have discussed are based on vector layers. MapInfo Professional takes thematic mapping to a new level with a method that displays data as continuous color gradations across the map. This type of thematic mapping, known as grid mapping or surface theme mapping, is produced by an interpolating point data from the source table. MapInfo Professional generates a grid file from the data interpolation and displays it as a raster image in a Map window.

Grid theme maps are appropriate analytical tools in traditional GIS environments and other industries where the data points have measured values that reflect those locations. For example, use grid shading to illustrate temperature changes, snowfall amounts, or change in elevation.

The next figure shows the light to dark gradual transition across the United States, which represents low to high average annual temperatures. The continuous shading allows you to derive measurements at places other than where measurements were taken.

Figure: Grid Surface Thematic Map



Grid Image Files

Grid mapping produces a file type called a grid image. When you create a grid thematic map using MapInfo Professional's grid handler, MapInfo Professional generates a default file name of *tablename_fieldname* with the extension .MIG (for example, USELEV_ELEVFEET.MIG). In the Step 2 of 3 dialog box MapInfo Professional displays the path and the root file name, where you can change it as necessary.

MapInfo Professional contains one read/write grid handler and a Grid Engine tool kit that shows you how to create your own. Once you have written a grid engine, you place this file in your MapInfo Professional application directory and set the preference in the Map Window dialog box. Specifically, to set the default grid writeable handler, go to the Map window preferences and specify your grid handler file. The available handler formats depend on what grid handlers have been installed. Changing the default grid handler will change the default file extension of the grid file name.

Grid files are stored by default in the data directory specified as a preference. Grid files can be opened from the **File** menu, click **Open** command like other MapInfo Professional supported file types.

When you open a table that has a grid filename associated with it, MapInfo Professional searches for the file if it cannot find it immediately. For example, the search capability can simplify opening tables if your .tab file refers to an image that resides on a CD-ROM drive, and different letters are used to designate the CD-ROM drive on different systems.

MapInfo Professional uses the following search order:

1. Search for the file where specified by the FILE tag in the .tab file.
2. Search for the file in the same directory as the .tab file.
3. Search for the file in the Table Search path specified in the Directories preferences.

MapInfo Professional either opens the table as though it found the file in the specified location, or it will report an error because the file could not be found in any location.

Working with Grid Handlers

In addition to the MapInfo Professional read/write grid handler (*.MIG) we also supply READ-ONLY grid handlers to support the direct opening of the following grid file formats:

- DEM–USGS ASCII(*.DEM)
- DTED–levels 1, 2, and 3 (*.DT0, *.DT1, *.DT2)
- GTOPO30 (*.DEM)
- MapInfo Vertical Mapper (*.GRD, *.GRC)

You can open these grid file types directly from the Open dialog box. You will see the file extensions listed next to the Grid Image file type in the **Files of Type** drop-down list in the bottom of the dialog box. Because the handlers are read-only, they cannot be used to create grid files during the thematic mapping process.

If the relief shading option is enabled (Create Thematic Map Step 3 of 3 > **Styles** > **Grid Appearance**), a separate file will be created to store the hill shade information. The hillshade file is stored in the same location as the grid file and has the same base name as the grid but with the extension ".MIH". If the grid file is read-only, for example, it's located on a CD, the .MIH files will be created in the same location as the .tab file. The .tab file will contain a new metadata key, for example:

```
"\Grid\Hillshade File" = "d:\tmp\AntiochSouth.MIH"
```

Vertical Mapper Grid Handler

MapInfo Professional also includes the Vertical Mapper Grid handler to enable users who have not purchased the full Vertical Mapper add-on product to open, view, and print Vertical Mapper Grid (*.GRD, *.GRC) format files.

The Vertical Mapper Grid files can also be opened directly in MapInfo Professional. The *.GRD or *.GRC extension is listed with the other Grid Image formats in the **Files of Type** drop-down list.

Currently, grids using the Vertical Mapper handler cannot be modified in the Modify Thematic Map dialog box. They are read-only. They must be created or modified in the Vertical Mapper source application, which is available from MapInfo. In addition, you cannot create .GRD or .GRC files in MapInfo Professional, however, you can convert *.GRD files to *.MIG files with Gridtools.MBX.

The Help System contains these related topics:

- *Creating Custom Read/Write Grid Handlers*
- *IDW Interpolator*
- *TIN Interpolator*
- *Grid Appearance*
- *Inflection Methods*
- *Relief Shading*
- *Grid Translucency*
- *Final Adjustments*
- *Zoom Layering*

11

Buffering and Working with Objects

Two of the most important features in MapInfo Professional are buffers and the tools we provide to work with objects. Buffers allow you to create grouping areas around objects, lines and regions, which is important for providing a visual analysis. You can edit an manipulate objects in a wide variety of ways. The Set Target editing model allows you to apply a wide range of editing operations to an object or a series of objects. Using MapInfo Professional you can also create territories and create objects. This chapter covers these topics and discusses the advanced topics of enclosing, checking, and cleaning objects.

In this Chapter:

- Buffering Your Data 378
- Editing Objects using the Set Target Model 385
- Creating Territories by Combining Objects 393
- Creating and Manipulating Objects 396

Buffering Your Data

If you would like to search for all underground cable wires that are buried within 440 yards of Interstate 490 or you would like to contact all families with pre-school age children who live within five miles of a proposed school district, buffering is the tool for you.

Understanding Buffers

A buffer is a region that surrounds a line object, another region, symbol, or any other object in a Map window. For example, you can create a buffer region that surrounds Interstate 90 by 440 yards on either side. You can create a buffer region that surrounds the proposed school district by five miles on all borders. Both the 440 yards and five miles are their respective regions' buffer radii. The buffer table is then joined to data associated with the original buffered objects.

Note: The maximum buffer resolution is 500 segments per circle. This affects the entry you can make in the Smoothness field of the Buffer Objects dialog box.

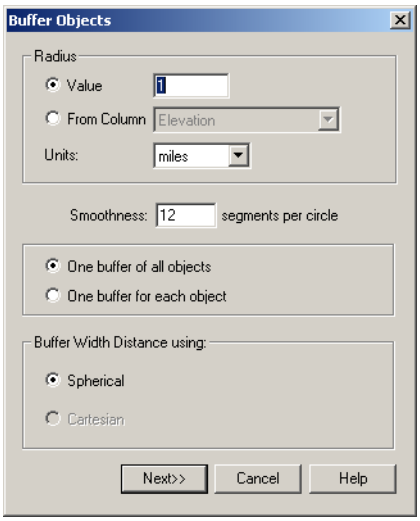
Creating a Buffer

To buffer objects:

1. Select the objects that you want to buffer. Make sure there is an editable layer in the Map window. The output buffered objects will be placed in that layer.

   Note: There are certain table variables that you need to be aware of that will determine the aggregation method used in joining the table of buffers to data associated with the original objects. See **Table Variables** for this information.

2. On the **Objects** menu, click **Buffer**. The Buffer Objects dialog box displays.



3. Select appropriate buffer radius, segments per circle, distance type calculation to use, and buffer method as described.

   - **Radius** — The radius is the width of the buffer you want to create around the object you selected. The **Value** and the **From Column** radio buttons give you different ways to specify that width.
   - **Value** — Type a value into this field if the radius of the buffer you want to create is a specific distance. Examples might include 10 feet, 20 kilometers, 50 chains.
   - **From Column** — Select this radio button if the buffer you want to create is specified in a particular column or is to be calculated by an expression. Then select the column or choose **Expression** from the drop-down list.

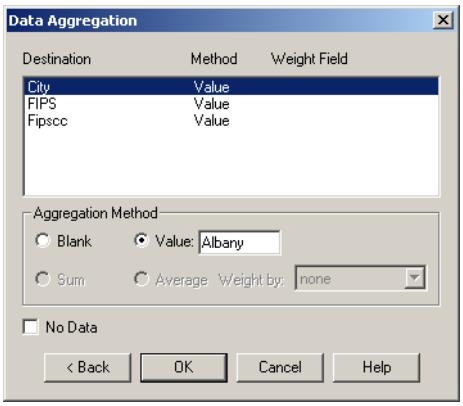
     If you select **Expression**, the Expression dialog box displays. Specify the expression you want MapInfo Professional to use to calculate the buffer radius and click **OK** to return to the Buffer Objects dialog box.
   - **Units** — Select the units for the buffer from this drop-down list. Options include: inches, links, feet, US Survey feet, yards, rods, chains, miles, nautical miles, millimeters, centimeters, meters, kilometers.
   - **Smoothness** — Type the number of segments per circle that determines the resolution of the curves in the buffer polygon. You can enter a number between 3 and 100. The default value is 12 segments per circle.

     The more segments you enter, the smoother the curve. The fewer segments, the more jagged the curve. More segments produce a smoother curve; fewer segments make a more jagged curve.

     Note: Creating a buffer is time consuming. The higher the smoothness (more segments), the longer it takes to create a buffer.
   - **One buffer of all objects** — Select this option to create one buffer for all of the objects you have selected. For example, if you are buffering Pennsylvania, New York and New Hampshire, one buffer will be created for all three of these objects.
   - **One buffer for each object** — Select this option to create one buffer for each object you have selected. For example, if you are buffering Pennsylvania, New York and New Hampshire, each object will have a separate buffer.
   - **Buffer Width Distance using Spherical** — Select this option if you want the buffer to take into account the curvature of the Earth. Using this method, MapInfo Professional converts the data to Latitude/Longitude and then creates a mathematical calculation of the buffer. You cannot use this method for non-Earth projections.
   - **Buffer Width Distance using Cartesian** — Select this option if you want the buffer to be calculated as if the map is on a flat plane. Cartesian coordinates are a pair of numbers, (x, y), defining the position of a point in a two-dimensional space by its perpendicular projection onto two axes which are at right angles to each other. If you are using a Latitude/Longitude projection, this option is disabled.

4. When you have completed your entries and selections in this dialog box, press the **Next** button. The standard Data Aggregation dialog box displays.

Note: If the editable layer is the Cosmetic layer, the Data Aggregation dialog box will not display because there is no data in the layer to aggregate. The **OK** button displays in place of the **Next** button. Press **OK** to begin the buffer operation.



5. Highlight each of the columns to complete the fields in this dialog box.
   - **No Change** — Select this option to keep the value for the selected column in the target row unchanged. This option only displays when you combine objects into a target object.
   - **Blank** — Select this option to store blank values in the selected column(s). To store blank values in all displayed columns, select the **No Data** check box. Only choose the **Blank** option to blank out individual columns.
   - **Value** — Select this option to store the value that displays in the edit field in the new row. When you select this option, enter an appropriate value in the field.
   - **No Data** — Check this check box if you want no data aggregated to any column.
6. After setting the appropriate data aggregation parameters, click **OK**. MapInfo Professional calculates the buffer according to the parameters you set and creates the new objects in the editable layer. The original objects remain unchanged. Once MapInfo Professional has created the buffer region, it puts it in the editable layer.

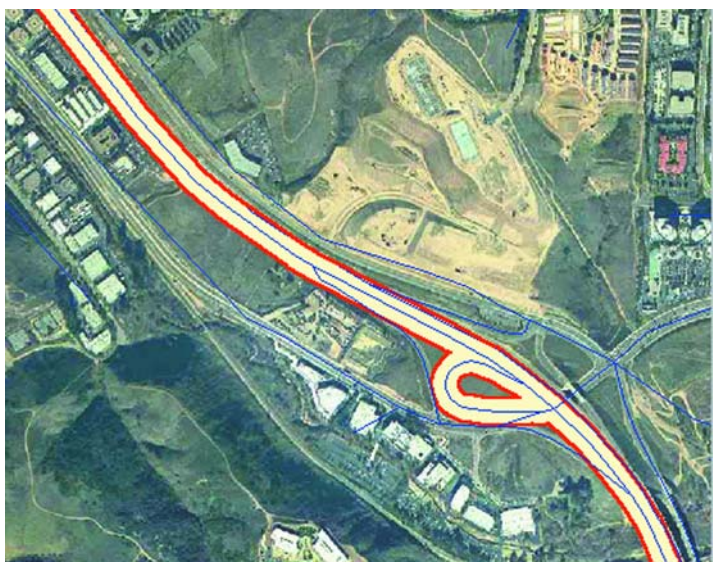


Table Variables

If the table containing the selected table and the editable table are either the same table, or contain the exact same table structure (same number of columns with each column in both tables having the same name and data type), then the Sum and Average radio buttons do not display. The data is taken from the current selection, and the results are placed in the editable layer.

If the table containing the selection objects and the editable table are different, and the table structures are different, then the Sum and Average radio buttons are displayed. In this case, the data aggregation for the editable destination table column is initially blank, and you needs to select the column from the input selection table to derive the data from.

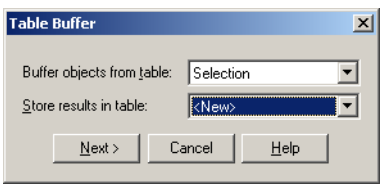
Saving your Buffer as a New Layer

You can create a buffer and save it as a new table (layer) or as part of another layer in your map. *See Saving your Voronoi Polygon as a New Layer* in the *Help System*. This process is also similar to the Combine Using Column process, except that there is no “Group By” functionality for buffers.

Note: The table must be mappable to use this feature.

To create the buffer as a distinct layer:

1. To create a selection to buffer, select the object in the map. This step is not required if you want to buffer all objects in a particular table.
2. On the **Table** menu, click **Buffer**. The Table Buffer dialog box displays.



3. Do one of the following:
   - To buffer the selected object, leave the **Selection** object selected in the **Buffer objects in table** drop-down list box.
   - To buffer objects from a particular table, select the table in the **Buffer objects in table** drop-down list box.
4. Select the type of table you want to place the buffer into from the **Store results in Table** drop-down list box. Select one of the following:
   - **New table** — allows you to save the buffer in a new table
   - **<tablenames>** — allows you to save the buffer in one of the currently open tables

   After you make this selection, click **Next** to continue.

   Note: You cannot save a buffer to the Cosmetic Layer.
5. Do one of the following:
   - If you chose the **New table** option, go to *Saving a Buffer to a New Table* in the *Help System*.
   - If you chose <tablenames>, go to *Saving a Buffer to an Existing Table* in the *Help System*.

Buffer Radius

The buffer radius determines the dimensions of the buffer region. For example, if you want to create a region that covers an area one mile on either side of a freeway, set your buffer radius to 1 mile. If you choose to use a field from the table or an expression, MapInfo Professional will calculate the radius of the buffer based on that value.

You can set the radius to be a constant value or you can choose a data value from the table to be used as the radius. For example, to create buffers around major cities that reflect the size of their population, choose the population field as the value.

You can go even further to calculate the buffer radius using an expression. For instance, you want to create buffers around cities showing the population density. Since you do not have a field containing population density, you will need to write an expression that can calculate density from population and area. This is no different than writing an expression for thematic mapping or query selection.

Buffering - Setting the Number of Segments per Circle

The number of segments per circle determines the level of detail in the buffer region. The more segments per circle, the higher the level of detail. The default level is 12 segments per circle.

Buffer Width Distance

MapInfo Professional's buffering feature calculates the buffer width to create a buffer that is some measured distance from the outline of the object. This distance is calculated using either the Spherical or Cartesian method.

Spherical calculations measure distance according to the curved surface of the Earth. This means that the distance from the boundary of the original object to the boundary of the new buffered object may vary from node to node.

Cartesian calculations measure distance on data that has been projected onto a flat, X-Y plane. This produces buffers that are exact in width, as long as the data is not in a Latitude/Longitude projection.

The availability of the Spherical and Cartesian buttons depends on the type of calculation that is appropriate to the table's projection. The **Cartesian** button will not be available if the table is in a Latitude/Longitude projection. Conversely, the **Spherical** button will not be available if the table is in a Non-Earth projection.

Buffer Methods

You can create a single buffer to include all selected objects, or create individual buffers for each object. There are two ways you can buffer multiple objects at the same time. The first method is to create one buffer for all objects. Buffers are produced around each input object, and the resulting buffer objects are combined into a single output object.

The more powerful method is to create one buffer for each object. For example, you have a layer of satellite offices. You would like to create a five-mile radius buffer around every satellite office symbol. You select all office symbols (with either the Select All command or Select tool), on the **Objects** menu, click **Buffer**, and select the option to create one buffer for each object. MapInfo Professional

creates five mile buffer polygons around each point. With this method, MapInfo Professional considers the resulting buffers as individual region objects and does not combine them into one. Once you create a buffer region, you can search for objects within it, as with any other boundary.

About Buffer Calculations

Buffer functionality uses a Width setting to create a Buffer that is some measured distance from the outline of the object. Using Latitude/Longitude data, the perfect buffer width, as defined in native Latitude/Longitude decimal degrees, may change on different portions of an object. This is because the width is provided is some flat measurement unit, (for example, miles, meters), and the decimal degree to measurement transformation will vary depending on the location on the earth. For example, a mile spans a larger number of latitude degrees as you move toward the poles of the earth and away from the equator.

MapInfo Professional calculates a native decimal degree width (converting from the input measurement unit) for one location in the object, typically the center of the bounding box. Thus, the measured On Earth (Spherical) distance from the boundary of the original input object to the boundary of the new buffered object may vary slightly from node to node. On small objects the distance may be negligible. On objects that span a large distance, such as the United States, the distance variation may be measurable.

In MapInfo Professional, you can produce Cartesian calculated buffers. Using this option, the data is considered to be in a flat-projected coordinate system, and the measured buffer widths are calculated using Cartesian distances. This produces exact buffers (as measured by the Cartesian Distance functions) as long as the data in not in a Latitude/Longitude projection.

Types of Buffers

There are two basic types of buffers that we support in MapInfo Professional.

- **Concentric ring buffers** allow you to create circles around map object(s) or point(s) and compute aggregated values for underlying data that occur within each ring. You would use concentric ring buffers to determine the number of customers within a certain radius of a store or other location.
- **Convex hull buffers** create a region object that represents a polygon based on the nodes from the input object. You can think of the convex hull polygon as an operator which places a rubber band around all of the points. It will consist of the minimum number of points so that all points lie on or inside the polygon. With convex hull buffers, no inside angle is greater than 180 degrees.

For specific instructions, see *Specifying Buffer Calculations* in the *Help System.*

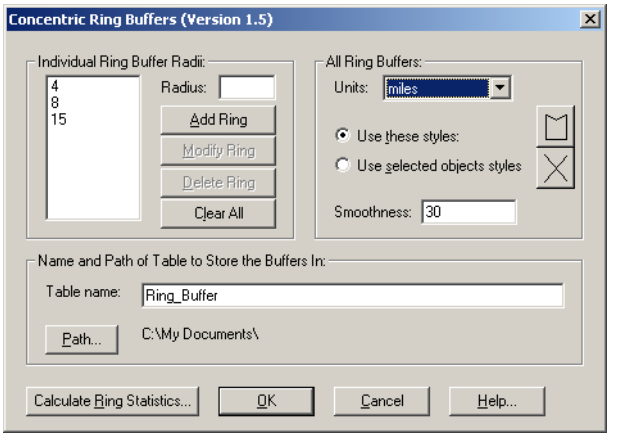
Concentric Ring Buffers

In the **Creating a Buffer on page 378**, you learned how to create a buffer around one or more objects. Concentric ring buffers allow you to create multiple buffers of different width (radii) around an object or a set of selected objects. The Concentric Ring Buffer tool can assist you in creating this type of buffer.

- For specific access instructions, see *Concentric Ring Buffer Tool* in the *Help System*.

To create concentric ring buffers:

1. In the Map window, select the object(s) you want to place buffers around.
2. On the **Tools** menu, point to **Concentric Ring Buffers** and click **Create Ring Buffers**. The **Concentric Ring Buffers** dialog box displays.



3. To add a ring, specify the radius in the **Radius** field and click **Add Ring**. Continue this until you have added all of the rings you want from the smallest to largest.
4. Select the units of each radius in the **Units** drop-down list.
5. To set the smoothness of the ring buffer, type a number between 3 and 100 in the **Smoothness** field. The larger the number, the smoother and less jagged the curves of the ring.
6. Type the table name and select the path in which you want to store this buffer information. MapInfo Professional stores the concentric ring buffer information into this table including the columns containing the ring number, radius value, radius units, area, and area units for each ring.
7. When you have finished the buffer settings, click **OK**.

Use the Modify Ring and Delete Ring buttons to change the ring settings, or click Clear All to start all over and create new concentric rings. To change the style of a buffer ring, select it in the Buffer Radii list, and use the style buttons to change the fill pattern and line style for the buffer. You can also collect data within each buffer ring using the Calculate Ring Statistics button.

Convex Hull Buffers

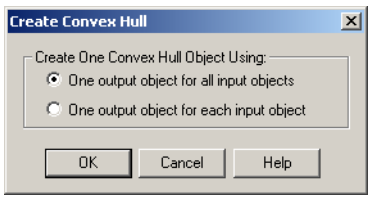
The Convex Hull command provides another means of creating a polygon around a selected object or objects. Convex Hull is similar to creating a buffer in several ways. Like a buffer, the Convex Hull command always creates an object from the input objects, and it will place the result objects into the editable layer. In addition, you have a choice to create one convex hull object from all of the input objects, or to create one convex hull object for each input object.

The resulting region object(s) are based on the nodes from the input object. The Convex Hull operation can be thought of as an operator that places a rubber band around all of the points. It consists of a minimal set of points such that all other points lie on or inside the polygon. Since the

polygon is convex, no interior angles are greater than 180 degrees. No attribute data is aggregated in this operation. To use Convex Hull, a Map window must be active, it must have an editable layer, and objects in the editable layer must be selected.

To create convex hull objects:

1. On the **Objects** menu, click **Convex Hull**. The Create Convex Hull dialog box displays.



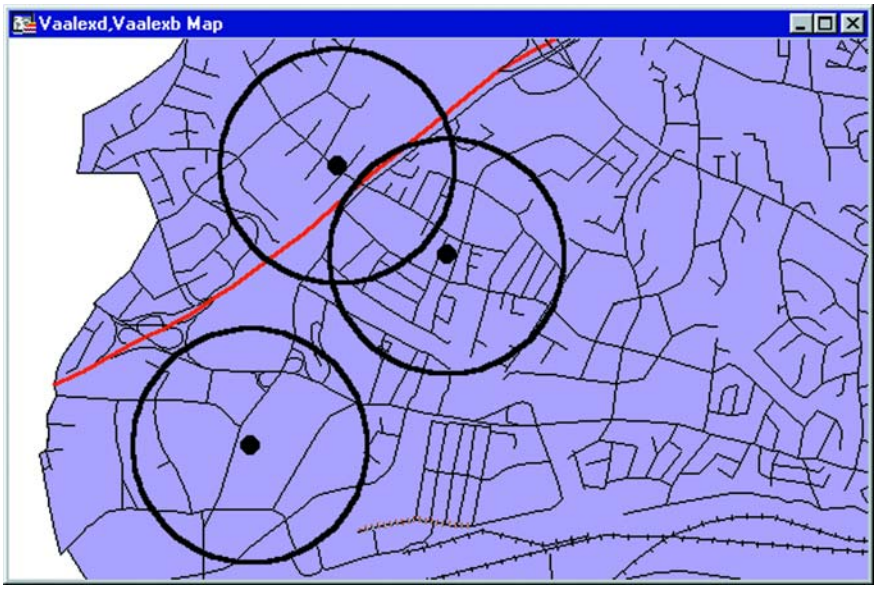
2. Select the type of convex hull objects you want to create. You have two options:
   - **One output object for all input objects** button is the default setting. It creates one convex hull object around all of the selected objects.
   - **One output object for each input object** button creates a convex hull object around each selected object.
3. Click **OK**. Your map redisplays. The convex hull object(s) is displayed over the input objects. If you want to save this data, save the editable table. The convex hull object is selected when it displays.
4. To change the fill of the convex hull object, do one of the following:
   - Double-click it to display the Region Object dialog box. Click the **Style** icon at the bottom of the dialog box to display the Region Style dialog box. Make any changes you like and click **OK**.
   - Select the convex hull object, if it is not already, and on the **Options** menu, click **Region Style**. The Region Style dialog box displays. Make the changes you want and click **OK**.

Editing Objects using the Set Target Model

With MapInfo Professional's advanced set target editing functionality, you can combine, split, erase map objects, and overlay nodes using a "Set Target – Apply Action" editing model. This model allows you to use objects from the same table or another table to create new objects. Sophisticated data aggregation methods allow you to calculate new data values that match the new objects.

The Set Target editing model in MapInfo Professional allows you to set a map object as the target for editing, then create a modifying object that will act as the cookie cutter that overlays the target and performs the editing action on the target. Set Target is located under the **Objects** menu.

Figure: Buffered retail locations showing market penetration



The Set Target model for editing map objects can be broadly described as a three-step process:

1. Set the object you want to edit as the target.
2. Choose and select another object or objects to act as the modifying object for the editing operation. You can also create a new object.
3. Perform the edit operation (combine, split, erase, erase outside, or overlay nodes).

A new object (or objects) is created in place of the target object.

The following table describes valid cutter/target objects for supported object processing operations:

Object Type	Overlay Nodes		Split, Erase, Erase Outside		Combine	
	Cutter	Target	Cutter	Target	Target	Other non-target
Closed	X	X	X	X	X	X
Linear	X	X		X	X	X
Text						
Points				X	X	X
Multipoints				X	X	X
Collections				X	X	X

You are not limited to working with map objects in the same layer. While the target objects must be in the Editable layer, you can choose the modifying objects from another layer.

The set target process is essentially the same whether you want to combine objects or create new objects by splitting objects or erasing portions of objects. Each operation is discussed individually in this chapter.

In addition to creating new map objects, the Set Target model allows you to control how the data associated with the target object will be transferred to the new object or objects. The next section discusses a number of data aggregation and disaggregation methods that give you tremendous flexibility with editing map objects.

- For specific instructions, see *Setting a Map Object as a Target* in the *Help System*.

Understanding Object Size

Many customers use the contouring process to create signal coverage maps, which requires large object sizes to create highly detailed coverage areas. To accommodate this need, we have increased the limit on number of nodes and the number of polygons or polylines that can be stored in objects.

Theoretically, the size of an object is only limited by the amount of memory in the system, but for practical reasons, a limit is imposed to work within limits of file size and most system memory limits. Currently, the object size limit is 1,073,741,823 bytes in memory. This limit is imposed so that an object of this size can be saved into a MAP file. All MapInfo Professional files have a theoretical limit of 2GB, but due to header size and other required Map file contents, the actual size limit has to be somewhat less.

The node limit is 134,217,724 nodes in any object. This is the actual number of nodes that can fit into this 2GB memory size limit. It will be difficult to reach this node limit because memory allocation may prohibit it. It may not be possible to create a Map this size on a computer being used to accommodate an object this size; the program may throw an error when you try it.

Keep these notes in mind:

- For regions, the theoretical maximum number of polygons in a multi-polygon region or collection is 20,648,881 polygons that can fit into the size limit for all objects given above.
- For polyline objects, the theoretical maximum number of segments in a multi-segment polyline is 24,403,223 that can fit into the size limit for all objects given above.
- For multipoint objects, the theoretical maximum number of nodes is 134,217,724 that can fit into the size limit for all objects given above.

Aggregating and Disaggregating Data

If you have data attached to map objects that will be edited, you can proportion the data for each field to match the new object(s). This is called data aggregation or disaggregation, depending on whether you are combining or splitting objects. MapInfo Professional calculates new data values for the object depending on how you specify the aggregation or disaggregation.

When combining objects, you can choose from several methods of data aggregation, including:

- **Sum** – adds the field values from the original objects to create a total for the field in the new object.
- **Average** – averages the field values from the original objects.
- **Weighted average** – gives more weight to one value over another when averaging. You can choose a numeric field in your table as the weighting factor or choose area (where the weighted average is based on the relative geographic area of the regions to be combined).
- **Value** – stores a specific value in the field of the new object.
- **No Change** – maintains the value of the target object in the new object.

When splitting or erasing portions of a map object, you can choose from:

- **Blank** – removes the original value of the target object.
- **Value** – maintains the original value of the target object.
- **Area proportion** – removes a portion of the original value based on the size of the new object.

With any of the editing operations under Set Target, you can elect not to bring over any data at all by choosing the **No Data** check box. You might do this, for instance, if you are only editing map objects for presentation purposes and do not need any data associated with the objects.

The **Data Aggregation** (or **Disaggregation**) dialog box displays after you have set the target, chosen the modifying object, and chosen an editing operation. In these dialog boxes, you must specify how you want the data calculated for each field. Once you are satisfied with the aggregation method, you can carry out the editing operation.

Clipping a Region of a Map

You can use **Map > Set Clip Region** to isolate a region of a map for display and/or printing. The clipped region may be a pre-defined map region, such as a state, or you can use a drawing tool to define a region. Use the Select tool to select a pre-defined region or a region that you defined. Thematic maps and seamless layers, labels, and points displayed on the map will be included in the clipped region.

- For specific instructions, see *Clipping a Region of a Map* and *Setting Clip Region Options on the Fly* in the *Help System*.

To toggle between the map and the clipped region, you may find it useful to use the Clip Region On /Off command.

Note: To clip a raster image, use an object created in the cosmetic layer, or an object from an existing vector layer.

- For specific instructions, see *Saving a Clipped Region of a Map* in the *Help System*.

Overview of Combining Map Objects

When you choose Combine, MapInfo Professional performs two operations:

1. MapInfo Professional geographically combines the selected objects. The new object represents the geographic union of the original objects. Therefore, if you select two adjacent region objects

and choose Combine, MapInfo Professional combines the regions into a single object, and the border between the regions disappears.

2. MapInfo Professional performs data aggregation. Data aggregation is a process where MapInfo Professional calculates what the column values for the new object should be, based on sums or averages of the values of the original objects.

Perhaps you have a table of sales territories, and the table contains demographic information about the number of households per territory. Using the Combine command, you can combine two of the sales territories into one, large territory. In the same operation, MapInfo Professional also can calculate the number of households in the new territory by adding the values from each of the original territories.

Combining Objects with Set Target

The Combine operation can work in conjunction with the target feature of MapInfo Professional's Edit menu. Before you choose Combine, you can select one map object, and designate that object as the editing target. You can then select additional map objects and choose Combine to combine the selected objects with the target. If you set a target before you choose Combine, the Combine operation is more flexible, allowing you to combine objects from different tables.

You should assign a target object if one of the objects you are combining is more important than any of the other objects. For example, if you want to add small, unnamed islands to an existing "mainland" region, you should make the mainland region the target object. If you designate the mainland region as the target, MapInfo Professional is able to retain the mainland region's name after the objects are combined.

Using Combine with Set Target allows the mainland region to retain its name after the objects are combined. You can only set one object as the target at a time when using Combine with Set Target. The modifying object can consist of more than one object.

Keep in mind that the Objects Combine command works with selected map objects. To apply the combine operation to an entire table, use Select All in the Query menu. To combine into groups rather than objects, or output to a separate table, use Combine Objects Using Column in the Table menu.

To combine map objects using Set Target:

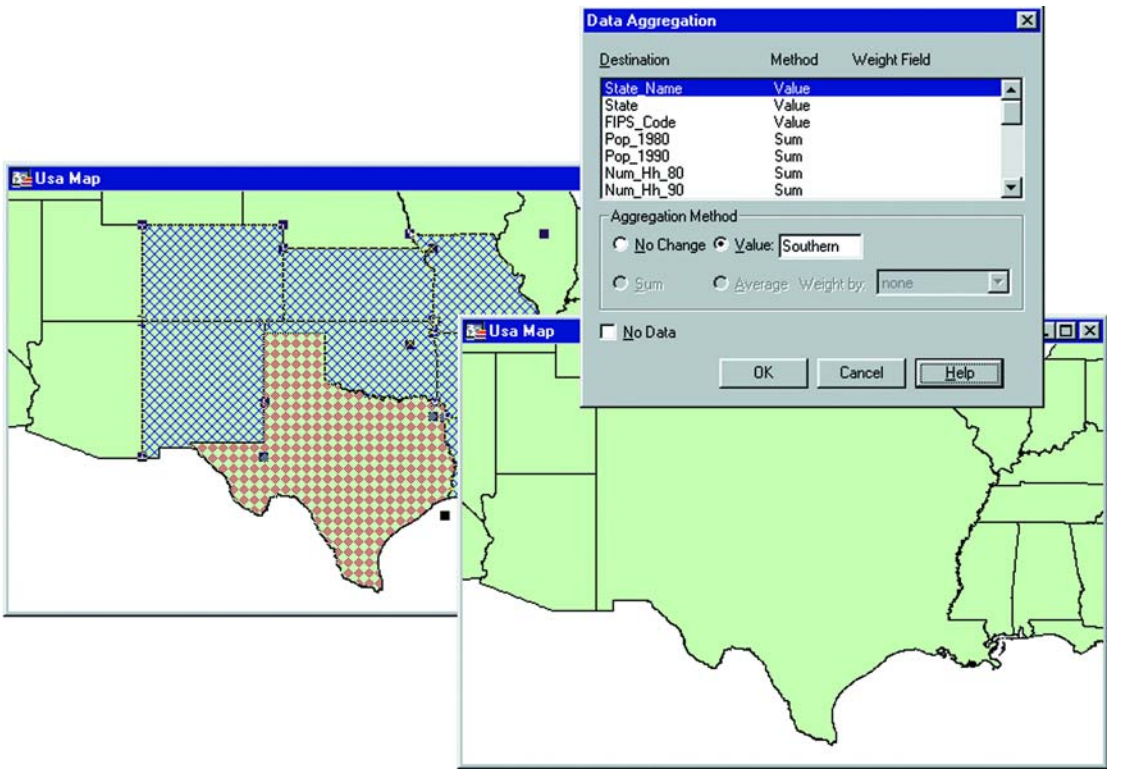
1. Select one object in an editable layer to be the target object.
2. On the **Objects** menu, click **Set Target**. The object displays in a different style to indicate that it is the target object.
3. Select (or create and select) one or more map objects from any layer in the Map window. This is the modifying object.
4. On the **Objects** menu, click **Combine**. The Data Aggregation dialog box displays.

5. Choose the appropriate aggregation method (or **No Data**) for each field in the **Destination** list. See the definitions for these methods in Aggregating and Disaggregating Data on page 387.

   Note: To select more than one field in the **Data Aggregation** dialog box at a time, use these keystrokes:

   - **Shift-click** to apply the same method to consecutive fields
   - **Ctrl-click** for non-consecutive fields.

   When you have chosen the aggregation methods for each field, click **OK**.



6. Select one or more columns by clicking in the list at the top of the **Data Aggregation** dialog box.
7. Choose a data aggregation method: **Blank, No Change, Value, Sum, Average**, or **Weighted Average**. (Depending on whether you specified an editing target, some of these aggregation methods may not be available.) MapInfo Professional updates the column list in the upper half of the dialog box to show the chosen method.
   - For example, if you choose **Average**, you are telling MapInfo Professional to calculate the average of the column values of all the selected objects. This average is stored in the column of the new row.
   - Aggregation methods are described below.
8. Repeat steps 6 and 7 for all columns in your table and click **OK**.
   - To simplify this process, select multiple columns at one time by **Shift**-clicking and/or **Ctrl**-clicking in the list of columns. If you select multiple columns, and then choose an aggregation method, MapInfo Professional applies that method to all selected columns.

If your table contains a large number of columns, it can be time-consuming to specify aggregation methods for all columns. However, MapInfo Professional remembers your aggregation methods for the remainder of your session; thus, the next time you choose **Combine**, you do not need to respecify all aggregation options.

MapInfo Professional computes the new object and displays it as a single object. Use the Info tool to view the aggregated data (if any) associated with the object.

- For more information, see *Combining Points, Linear, and Closed Objects into a Single Object* and *Specifying Collection Object Attributes* in the *Help System*.

Default Data Aggregation Methods

When the Data Aggregation dialog box first appears, MapInfo Professional automatically assigns a default aggregation method to every column in the table. For numeric columns (Integer, Small Integer, Float, or Decimal), MapInfo Professional assigns Sum as the default aggregation method. For all other types of columns, MapInfo Professional assigns Value as the default method.

You could simply choose **OK**, without changing any of the default aggregation methods. However, there is no guarantee that the default aggregation methods will produce meaningful results. By default, MapInfo Professional uses the Sum method for all numeric columns; however, depending on your data, it may not make sense to total all of your columns.

For example, perhaps your table contains demographic information, such as median income statistics. If two adjacent regions have different median income values ($30,000 and $35,000), and you combine the two regions, it does not make sense to total the two values; instead, you should choose Average or Weighted Average as the aggregation method.

Clearing a Target

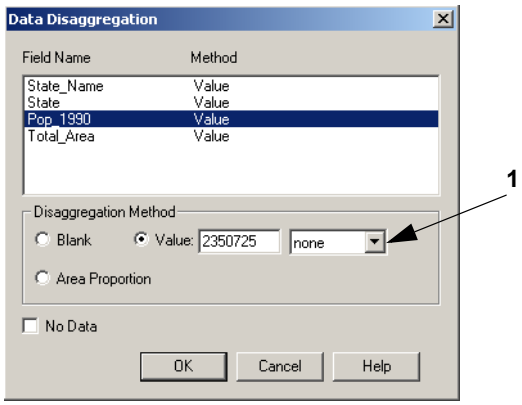
If you do not want to edit an object after it has been set as the target, use **Clear Target**. The object will no longer be highlighted or marked for editing. An object will also be cleared as a target automatically if it has been deleted or modified by Combine, Erase, Erase Outside, Split, Overlay Nodes, or if you have chosen a new target.

To clear a target:

- Choose **Objects > Clear Target**.

Combining Objects with Different Table Structures

If the tables you are combining have the same table structure, the process we have discussed in **Combining Objects with Set Target on page 389** works perfectly. When you are working with two tables with different table structures, the Data Disaggregation options are slightly different. When the input table has a different table structure from the output table, the Data Disaggregation dialog box displays a **Column Name** field to accommodate the table structure.



1 *Column Name field*

The **Area Proportion** radio button is active if the selected field is numeric. Also the **Value** entry field is enabled when you select the **Value** radio button and the drop-down list contains “none”.

Splitting Objects

Splitting Objects allows you to divide the target object into smaller objects, using another object as a cutter. You can also combine objects into territories using redistricting. For more about the redistricting process, see *Redistricting — Grouping Map Objects into Districts* in the MapInfo Professional *Help System*. For example, you might use Split to separate a large territory into smaller units.

You can split either closed objects (regions, ellipses, rectangles, or rounded rectangles) or open objects (polylines, lines and arcs) using the Split command. You cannot use Split on points or text objects or to cut objects that are not in editable layers.

- For specific instructions, see *Splitting Objects* in the *Help System*.

Proportioning Associated Data after Using Split

After using **Objects > Split**, you may want to proportion (disaggregate) the associated data. Data disaggregation splits the data associated with a map object into smaller parts to match the new map objects. For instance, you may want to split a state into regions and have the data previously associated with the entire state proportioned for each new region. When you initiate the **Split** command, a Data Disaggregation dialog box appears that allows you to specify how the data will be proportioned.

Splitting Map Objects Using a Polyline

You can split multipoints and collections, as well as closed objects (regions, ellipses, rectangles, and rounded rectangles), and linear objects (polylines, lines and arcs) using the Polyline Split command.

As mentioned previously, splitting objects requires that the cutter be a closed object. With Split Using Polyline, the polyline cutter will first be transformed into a region suitable for the cutter operation. The region created will be displayed for acceptance. The polyline(s) used as the cutter must be

contiguous and non-branching. In general, if the cutter polylines were to be combined, the result would be a one single section polyline. If the cutters are not polylines, and are not contiguous and non-branching, then an error will occur, and the operation will be cancelled.

Note: You cannot use Polyline Split on text objects or to cut objects that are not in editable layers.

- For specific instructions, see *Splitting MapObjects Using a Polyline* in the *Help System*.

Creating Territories by Combining Objects

Creating territories is one of the most common tasks performed with MapInfo Professional. Most people create territories by combining two or more smaller regions to create a larger one. Police departments combine postal code boundaries to create precinct boundaries. Sales managers combine county boundaries or state boundaries to create sales territories. Political analysts combine census tract boundaries to create voting districts.

Remember, when you are combining regions, you are also combining the data associated with the regions. If you combine regions without somehow aggregating the data associated with the regions, that data will be lost. For some applications, you might not want to save your data. For example, you are merging census tract boundaries to create school districts. The census tract data is of no interest to you; you merely want the boundaries. There is no reason to aggregate the data, but you would want to apportion the demographic data. For most tasks, you'll want to save the data associated with the regions.

MapInfo Professional gives you three methods for combining regions.

1. The first method, Combine, works with objects that are selected.
2. The second method, Combine Objects Using Column, is used to combine objects into groups based on a specified column.
3. The third method, Redistricting, is covered in *Redistricting — Grouping Map Objects into Districts*.

Most frequently, the Combine Regions options are your easiest and quickest options for combining regions and creating territories.

Combining Selected Objects

When you choose to combine objects, MapInfo Professional performs two operations:

- MapInfo Professional geographically combines the selected objects. The new object represents the geographical union of the original objects and the border between the regions disappears.
- MapInfo Professional performs data aggregation. As described earlier in this chapter, data aggregation is a process where MapInfo Professional calculates what the column values for the new object should be, based on sums or averages of the original objects.

Your setup of the **Layer Control** dialog box depends on whether you want to copy the result object to another layer (and, thus, save the original objects) or combine the objects in the original layer (and, thus, lose the original objects).

If you want to copy the result object, make the region's layer Selectable and another layer Editable. Specify a target object, then select the objects using any selection method and on the **Objects** menu, click **Combine**. This will display the **Data Aggregation** dialog box where you tell MapInfo Professional how to combine the data. Fill in this dialog box and click **OK** to combine the objects to combine the objects' data. This method was discussed earlier in this chapter.

If you want to combine objects in the original layer, make sure that the layer is editable, select the objects in the layer, and on the **Objects** menu, click **Combine**. Do not set a target. The **Data Aggregation** dialog box displays. After the operation is complete, a new object will be added to the layer, and the original objects will be deleted.

Combining Objects Using Column

Combine Objects Using Column allows you to modify geographic data to create new map objects that contain data about the group. This feature is similar to redistricting in that it groups objects together, but goes beyond redistricting to combine a copy of the relevant objects while leaving the original objects untouched.

To access Combine Objects Using Column:

1. On the **Table** menu, click **Combine Objects Using Column**.

   For example, you have a layer of states. You want to combine the state boundaries to create sales territories. The data record associated with each state looks like this:

SALES_REP	STATE	CUSTOMERS	AVG_SALES
Benita	West Virginia	1782	24231.4
Benita	Ohio	121	33265.0

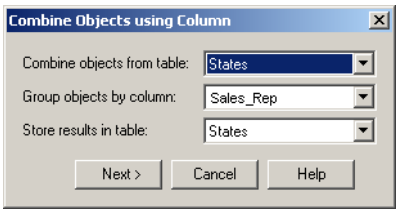
   - SALES_REP: Sales representative assigned to that state
   - CUSTOMERS: Number of customers per state
   - AVG_SALES: Average spent per customer

   You would like to aggregate the data in the following manner:

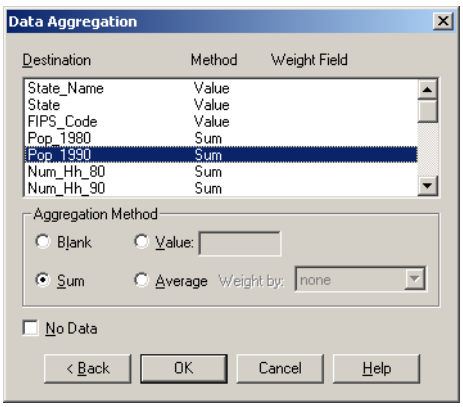
   - SALES_REP: Combine all records that list Benita as the sales representative
   - CUSTOMERS Sum up the number of customers in the sales territory
   - AVG_SALES: Average the amount spent per customer in the sales territory

   When performing a Combine Objects Using Column operation, you must specify which column contains the grouping information. In the preceding example, the grouping information is located in the SALES_REP column. We want to combine all of Benita's individual territories into one large territory.

2. Choose the appropriate column from the Group Objects by Column popup. In our example, you would choose the SALES_REP column from the Group Objects By Column popup. MapInfo Professional combines all records that have common data in the column. In other words, MapInfo Professional combines all records that have the same sales representative.



3. Specify the table and the grouping column.
   - If you chose <**New**> from the **Store results in table** drop-down list to create a new table for the combined objects, a series of dialog boxes prompt you to create the new table.
   - If you specified an existing table, you need to specify how to combine the data. To aggregate your data, click **Next** to display the Data Aggregation dialog box.



4. Once you have completed both dialog boxes, press **OK**. MapInfo Professional combines the records based on the column specified in the **Group Objects By Column** list. MapInfo Professional also aggregates the data and combines any objects associated with the records.

- For specific instructions, see *Combining Object Using Column* in the *Help System*.

Creating a Voronoi Polygon

The Voronoi polygon is a partition of space into cells. Voronoi takes points and produces regions (cells) as output where each cell contains exactly one point. Each cell is an area in which the contained points are closer to the enclosed site than to any others. Use Voronoi to generate these polygons from a designated set of points. It is useful for dividing areas of responsibilities for field offices or possibly postal zones. It ultimately gives you the areas that are closest to your point of interest. You can create a Voronoi polygon within the same layer, or select points from one layer and place the Voronoi polygon in another layer.

- For specific instructions and additional related topics, see *Creating a Voronoi Polygon* in the *Help System*.

Grouping Objects using Multipoint and Collection Object Types

The Multipoint and Collection object types allow you to group multiple objects into a single object. One way to create multipoints and collections is by using the Combine command (on the **Objects** menu, click **Combine**). These object types aid in the translation and live access of other GIS data formats, such as ArcView Shape Files, and are more compatible with GIS standards. This is particularly useful for sharing maps with others using different software.

A Multipoint object consists of a number of points that have been grouped into a single object. The Multipoint object displays in a Browser window as a single record, and all the points within the object have the same symbol. One method you can use to create a multipoint object is to select a group of point objects and combine them.

A Collection object consists of multipoint objects, zero or one polyline objects, and zero or one region objects that have been grouped into a single object.

MapInfo Professional automatically converts homogeneous Collection objects to a more specific type, for example, a Collection object that contains only polylines is automatically converted to a multi-polyline object.

- For specific instructions and additional related topics, see *Grouping Objects using Multipoint and Collection Object Types* in the *Help System*.

Creating and Manipulating Objects

The operations in this section do not make use of a target object to perform analysis or data aggregation. These tasks use selections to create new objects so that you can perform further mapping operations on those objects. The results of the operation are placed in the editable layer. The original objects remain unchanged.

See the Help System for related topics including:

- *Enclosing Objects*
- *Checking Regions*
- *Cleaning Objects*
- *Snapping Nodes and Thinning Objects*
- *Disaggregating Objects*
- *Erasing Objects*
- *Adding Nodes to an Object*
- *Displaying and Selecting an Object's Nodes*
- *Moving an Object's Nodes*
- *Copying and Pasting an Object's Nodes*
- *Deleting an Object's Nodes*
- *Checking Regions/Tables for Incorrect Data*

12

Stylizing Your Map for Presentations and Publishing

Most of us do not get to make maps solely for our own use. We use the maps we create in MapInfo Professional® to create presentations, to publish them on the web, or to include as part of another document. This chapter will help you create presentation quality maps and prepare you for printing and exporting your work.

Sections in this Chapter:

- Changing a Map's Style 398
- Labeling Your Map 403
- Working with Layouts 411
- Creating a Cartographic Legend. 422
- Printing and Exporting Your Results 424

Changing a Map's Style

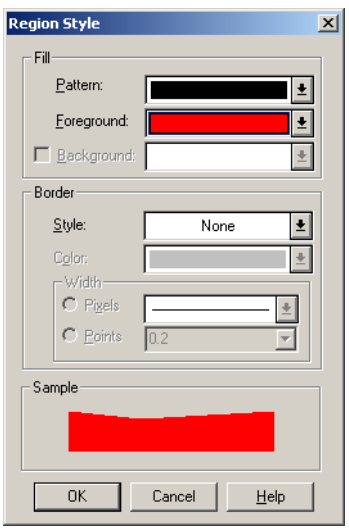
Changing the look of the map is an important part of making it more effective. In this section, we review how to change the way your map looks one piece at a time. For a more comprehensive change in your map's appearance, see *Create Thematic Maps* in the *Help System*.

Changing a Region's Style

To change the style of a region:

1. Do one of the following:
   - To change the style of one region, click the region and on the **Options** menu, click **Region Style** from the main menu.
   - To change the style of all regions in the same layer, click to display the **Layer Control** dialog box, highlight the layer you want to change and click **Display**.

   Using either method the Region Style dialog box displays.



2. Make the region changes you want to see in your map window in this dialog box and click **OK** to save them. If you opened Layer Control, click the **OK** button in that dialog box as well to see the results.

   Fill

   These are the fill options you have in the Region Style dialog box.

   Pattern

   Choose a palette for patterns. If you do not want to use a pattern, choose the letter N, for none; the foreground and background color are disabled. If you choose the solid black pattern, the background color is disabled.

Color

Choose a color for the object(s)' foreground. The Sample box displays the pattern using the foreground color you chose. The foreground color is applied to the part of the pattern that displays as black. Therefore, to make the object a solid color, choose the solid black pattern in the Fill Pattern palette and a color from the Foreground Color palette. The color you chose displays in the Sample box as a solid-colored region.

Background Color

Select the check box to display a background color; clear for a "transparent" background. Choose a color for the object's background. The background color is applied to the part of the pattern that displays as white. Background color is grayed if you chose the solid pattern.

Border

These are the border options you have in the Region Style dialog box.

Style

Choose the border line style.

Color

Choose the border line color.

Note: For more information, see *Creating Custom Colors* in the *Help System*.

Width

Choose the border line width. In the **Pixels** field, enter a number from 1-7, each number represents a line width in pixels. In the **Points** field, select or enter a point size.

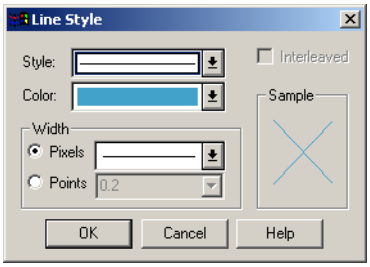
Sample

Displays the sample of the pattern and color selections you have made.

Changing a Line's Style

To change the style of a line:

1. Do one of the following to display the Line Style dialog box:
   - To change the style of one line, click the line and on the **Options** menu, click **Line Style** from the **Main** menu.
   - To change the style of all lines in the same layer, click to display the Layer Control dialog box, highlight the layer you want to change and click **Display**.



2. Make the line style changes you want to see in your map window in this dialog box and click **OK** to save them. If you opened this dialog box from Layer Control, click the **OK** button in that dialog box as well to see the results.

Style
Select the new line style from the drop-down list.

Color
Choose a color for the line from this drop-down list. The **Sample** box displays the pattern using the color and line style you select.

Width (in Pixels and Points)
Choose the line width from one of these drop-down lists. In the Pixels field, select a width of the line in pixels. In the Points field, select a point size from the drop-down list, or enter a point size.

Interleaved
If you select a line style that uses multiple passes to create it, MapInfo Professional enables the **Interleaved** check box. Keep in mind these notes:

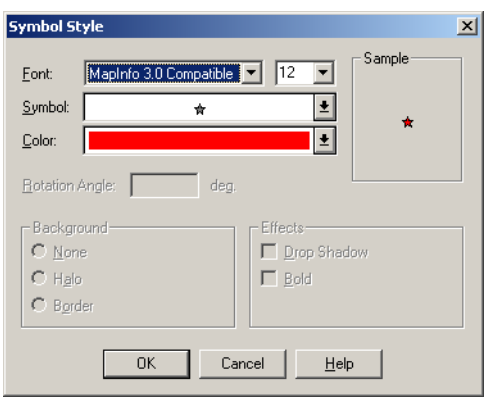
- The Interleaved option is not enabled for solid lines
- The Interleaved option is not activated for borders
- The Interleaved option is not appropriate for all multiple pass lines

Changing a Symbol's Style

To change the style of a symbol:

1. Do one of the following:
   - To change the style of one symbol, click the symbol and on the **Options** menu, click **Symbol Style** from the main menu.
   - To change the style of all symbols in the same layer, click to display the **Layer Control** dialog box, highlight the layer the symbol displays in and click **Display**.

   Using either method the Symbol Style dialog box displays.



2. Complete your selections and entries in this dialog box and click **OK**. If you opened this dialog box from Layer Control, click the **OK** button in that dialog box as well to see the results.

Font

Choose a font from the drop-down list. In addition to the symbol sets provided by MapInfo, the list displays any fonts installed on Windows. The Custom Symbols category lists those bitmaps you have created and saved to the CUSTSYMB directory.

Size

Choose a size or type a different point size. The maximum size is 240 points.

Symbol

Choose a symbol type from the symbol palette.

Color

Choose a color from this list for the symbol.

Reload

Click this button when you have added your own custom symbols to update the list. If you restarted MapInfo Professional since adding the new custom symbols you do not need to select the **Reload** button.

Full View

Click this button to display large images in a separate window.

Rotation Angle

Specify number of degrees the symbol should be rotated; 0-360.

Background

In this box, you can specify a background. Select one of these:

- **None**: Click this option to display no background.
- **Halo**: Click this option to display the symbol with a white border outline.
- **Border**: Click this option to display the symbol with a black border outline.

Effects

In this box, you can specify special effects for the symbol. Not all of these options display all the time. You can select one or more of these:

- **Bold**: Click this check box to draw the symbol in boldface.
- **Drop Shadow**: Click this check box to draw a drop shadow under the symbol.
- **Show Background**: Click this check box to display the custom bitmap symbol with the background with which it was created.
- **Apply Color**: Click this check box to replace all non-white bitmap pixels with the color you select from the Color palette.
- **Display at Actual Size**: Click this check box to display the image at the actual size.

Sample

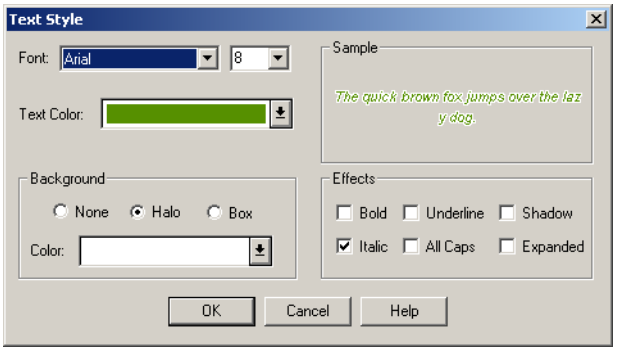
When you select a symbol style, it displays in this box to show you a sample of the symbol using the designated selections.

Changing the Text Style

To change the style of text:

1. Do one of the following:
   - To change the style of one text entry, click the text and on the **Options** menu, click **Text Style** from the main menu.
   - To change the style of all text entries in the same layer, click to display the **Layer Control** dialog box, highlight the layer the text entries display in and click Display.

   Using either method the Text Style dialog box displays.



2. Make your selections and entries in this dialog box and click **OK**. If you opened this dialog box from Layer Control, click the **OK** button in that dialog box as well to see the results.

   Font
   Choose a font from the **Font** drop-down list.

   Size
   Choose a point size from the **Point Size** drop-down list.

   Text Color
   Display the color palette; choose a text color.

   Background
   In this box, you can specify background options for the selected text. You can select only one of these options:

   None — Set no specific background for the selected text.

   Halo — Display the text outlined in a designated color.

   Box — Surround the text with a box in a designated color.

   Color — Display the color palette; select a color to halo or box the text.

   Effects
   In this box, you can specify special effects for the selected text. Not all of these options display all the time. You can select one or more of these:

   Bold — Select this check box to display text in boldface.

   Italic — Select this check box to display text in italic.

Underline — Select this check box to display text underlined.

All Caps — Select this check box to display text in all upper case letters.

Shadow — Select this check box to display a grey “drop” shadow under the text.

Expanded — Select this check box to insert double spaces between each letter in the text.

Sample
The results of the options you choose show in this box.

Labeling Your Map

The labeling features in MapInfo Professional® make it easier for you to display, edit, and save labels. You can specify whether to display labels automatically when you display the map or display the map without labels. You can edit automatic labels, use the customizing options to make your labels unique, and create individual labels with the Label tool. Haloing and positioning options enable you to get the precise look you want for your labels.

Designing Your Labels

The design of the label feature in MapInfo Professional is important for understanding how to create and manipulate labels on your map. Most important among the design elements are the following:

- Labels are not drawn to the Cosmetic layer.
- Labels are attributes of geographic objects in the map layer. The text is based on data associated with that object.
- Labels are always selectable and editable.
- Labels are saved to a workspace.

Labels are attributes of geographic objects in the map layer. They are not drawn to the Cosmetic layer and they are not Cosmetic objects. Their drawn location is based on the location of the geographic object’s centroid and additional information such as anchor point and offset controlled in the Label Options dialog box.

As attributes, labels are *dynamically* connected to their map objects. If the layer is closed or is made invisible, the labels no longer display. If the data or geographic information changes, the labels change. If you create an expression for your labels and change the expression, the current labels are dynamically replaced with new ones.

Labels are always selectable and editable, so you do not have to make the map layer editable or selectable to work with them. And, since labels are not Cosmetic objects, you do not have to remember to make the Cosmetic layer selectable or editable to label your map. They are already part of the map layer.

Saving labels is easy. Because labels are attributes of the map object, you do not have to remember to save them to a separate table. Any label edits you have pending, or changes you have made to the Label Options settings, are easily saved to a workspace.

You can label your map automatically through Layer Control, in the Label Options dialog box. All global settings for labels are controlled in the Label Options dialog box.

Choosing the Label Content

When you label your map automatically, or interactively using the Label tool, the content of the labels is determined by the data associated with the geographic object. You can obtain the labels from the columns in your table, or the derived result of an expression using the column information. If the column information or an expression does not suit your needs, you can edit the label content or type in new text. See **Editing Labels on page 410** for more information.

Text you create yourself using the Text tool is a text object and behaves like other objects you draw on your map such as squares and circles. Although labels are no longer text objects, text objects are still useful for additional map annotation such as titles. For information on text objects, see **Working with Text on the Map in Chapter 8 on page 287**.

The Autolabeler tool, available from the Tool Manager (on the **Tools** menu, click **Tool Manager**), creates labels as text objects in the Cosmetic Layer. This application may be useful if you need to create labels that can be transferred to a permanent table. In addition, you can create text objects and convert labels into text objects using another tool from the Tool Manager set, the Labeler tool, which is explained later in this chapter.

Labeling with a Column

The content of labels is controlled in the Label with drop down list in the Label Options dialog box. You can label an object with any column from its associated table. For example, you can label the STATES table with the state name, abbreviation, 1990 population, or any other field in the STATES table. Simply choose a column from the list, and the objects in that layer will be labeled with the information contained in that column.

Labeling with Expressions

You can also label objects with an expression. Select **Expression** from the drop-down list in the Label Options dialog box. Create the expression in the Expression dialog box. You can type the expression directly or use the drop-down lists to create it. For example, you want to label the countries of Africa with their name and population density on two lines. Your table contains the country names and population figures for each country. To figure the population density, divide population by each country's area. You can let MapInfo Professional calculate the area of each country using the Area function in the Expression dialog box. To create the expression, in Layer Control, highlight the Africa table and choose the **Label** button. Select **Expression** from the **Label with** drop-down list in the Label Options dialog box. The Expression dialog box displays. Using the drop-down lists, create the following expression:

```
Country + Chr$(13) + POPULATION / Area(Object, "sq mi")
```

The Chr$(13) function adds a carriage return to the first line. Using the Label tool, click a country. MapInfo Professional labels it with the result of the expression.

- For instructions and examples of this topic, see *Creating Labels using Expressions* in the *Help System*.

Saving Labels to a Workspace

Both automatic and interactive labels are saved as part of a workspace.

To save your objects:

1. Choose **File > Save Workspace**. The Save Workspace dialog box displays. The Save Workspace dialog box allows you to save information about the tables and windows used in your current session.
2. Select the drive, folder, and file where you want the workspace saved.
3. Type a name for your workspace.
4. Click **Save**.

Packing a Table with Customized Labels

Note that packing a table that contains customized labels can corrupt the labels. For example, you delete one or more rows from your table and save the table. Then you create a map with customized labels and save the labels to a workspace. You pack the table to purge the deleted rows. Since the Pack command closes the Map window, you'll need to reload the workspace. When you do so, your labels are corrupted.

This problem occurs most often when the deleted rows are located near the top of the Browser. To avoid the problem, pack the table before you create the labels.

Using AutoLabeling

In addition to label content, you control the position, display and look of automatic labels in Layer Control. The settings in the **Label Options** dialog box allow you to set conditions for displaying labels, in what style they will display, and in what position for all the objects in the layer.

Controlling Label Display

The Auto Label attribute in Layer Control is off by default for all map layers.

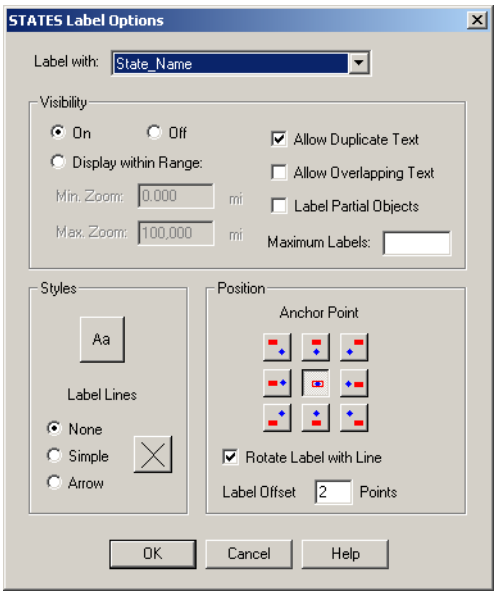
To activate labels for a layer(s):

- Select the layer or layers in the Layer Control dialog box and select the **Auto Label** check box for each layer. When you return to your map, labels display for all layers you selected.

You can easily turn the display of automatic labels on or off. In Layer Control, clear the **Auto Label** check box to turn labeling off. Any settings you have specified in the Label Options dialog box will be deactivated. You can also go into the Label Options dialog box and click **Off** in the Visibility group. Either way, when you go back to your map, the labels no longer display. These settings also apply to labels you have edited.

To make changes to the labels of a selected layer:

1. Select a layer in t**he Layer Control dialo**g box and select the **Label** button. The Label Options dialog box displays.



2. Select the appropriate options for your new labels and click **OK** to save them.

   Visibility — Use these options to indicate whether this label should display.

   Click **On** to display the labels for this layer.

   Click **Off** to hide the labels for this layer.

   Display within Range — You can also display labels within a specified zoom range, much the same way that you display map layers within a certain zoom range. Select a layer, click **Label**, and in the **Label Options** dialog box, click the **Display within range** button. This activates the Min. and Max zoom boxes. Fill in the minimum and maximum zoom distances in the appropriate boxes.

   When labeling a dense table of streets such as a StreetPro Display layer, only a few of the streets will be labeled when the map is zoomed out.

   The check boxes on the right side of the Visibility group control which labels display and determine how they appear on the map.

   Allow Duplicate Text — Select the **Allow Duplicate Text** check box to allow duplicate labels for different objects to display, for example, Portland, OR and Portland, ME. This option is also used with street maps to label street segments individually.

   Allow Overlapping Text — Select the **Allow Overlapping Text** check box to allow labels to be drawn on top of each other. Some labels do not display because they overlap labels that are have been given higher priority on the map.

   Label Partial Objects — Select the **Label Partial Objects** check box to label polylines and objects whose centroids are not visible in the Map window.

   Maximum Labels — To specify the maximum number of labels you want to display on your map, type the number in the Maximum labels box.

Styles — In this box, select the styles for the Labels and Lines in the selected layer.

No — No line displays extending to the label.

Simple — Create a callout by using a simple line that connects the label to the object's centroid. Label lines display after you move the label from where it was originally created.

Arrow — Create a callout by using an arrow and line that connects the label to the object's centroid. Label lines display after you move the label from where it was originally created.

Position — Use the Anchor Point and Offset options to specify the label's placement. The anchor point is the label's position relative to the map object. Click one of the buttons to select an anchor point. The next table describes each of the nine anchor point buttons.

Anchor Point Button	Position	Description
	Top Left	Places the label above and to the left of the anchor point.
	Top Center	Centers the label directly above the anchor point.
	Top Right	Places the label above and to the right of the anchor point.
	Left	Places the label directly to the left of the anchor point.
	Center	Centers the label at the anchor point.
	Right	Places the label directly to the right of the anchor point.
	Below Left	Places the label below and to the left of the anchor point.
	Below Center	Centers the label directly below the anchor point.
	Below Right	Places the label below and to the right of the anchor point.

The anchor point is an ongoing attribute of the label. For example, if you anchor a point object's label at Center Left and you increase the label's font size, the text will grow to the left. This way, the text can never overwrite the point.

The default anchor point varies with the type of map object you are labeling:

- Regions default to **Center**.
- Lines default to **Above Center**.
- Points default to **Right**.

Horizontal label

Select this option to display all labels horizontally.

Rotate label with segment
Select this option to run the label text parallel to the line segment. Using this option, a horizontal polyline would display parallel horizontal labels and a vertical polyline would display vertical street labels.

Curve labels along segments
Select this option to display the label along the curve of the polyline or arc segment.

Label Offset
Designate number of points (a measurement of text size) label should be placed from the anchor point.

If you are working with a layer that has line objects such as a street map, check the Rotate Label with Line or Curve labels along segments box to position the labels along the lines.

Label offset is how far away a label is from its anchor point. Specify the number of points you want the label to be from the anchor point in the Label Offset box.

The label's anchor point and offset move a label with respect to its current location and the current zoom. Whenever you want to make minor adjustments to the label's position, you should use these two options.

You can also select and drag a label to move it, but this is not recommended because you are actually moving the label location on the map. If you drag a label a few pixels, the distance you move it is in the current map units, regardless of the zoom. For example, if you are displaying a map of the United States and drag New York state's label a few pixels, at that zoom, the label looks fine. However, if the Map Units distance is in miles and you zoom in on New York state, the label will display much farther away than at the previous zoom.

Note: **Affecting Label Priority**: Labels display following the order of records in the table. To change the order of priority for displaying labels, save a copy of the table, sorted in order of priority -- most important record first -- and use that table for labeling instead of the original.

In a table sorted alphabetically by street (like the StreetPro Display layer) this often means that streets with names beginning with A, B, or C are almost the only labeled streets on your map. Labeling effectively gives a small side street like "Aberdeen Street" priority over "State Highway 177" or other major roads that might actually be useful in navigating or orienting a viewer. This will be true for any dense StreetPro Display layer.

- See *Set Font Anti-Aliasing Options for Labels* for more information in the *Help System*.

Creating Call Outs

Callouts are labels with lines pointing to the objects they are labeling. They are very useful when there are many labels in a relatively small area. For example, if you are labeling a map of Europe, where there are many small countries that are relatively close together, you can use callouts to make the labels easier to read.

1. Choose **Map > Layer Control** to display the Layer Control dialog box.
2. Make the Cosmetic Layer editable. Choose **OK**.
3. Click the **Text** button in the **Drawing toolbar**.

4. Position the **Text** tool where you want the arrow or line to point and type the text you want as the call-out.
5. Double-click the text with the **Select** tool. The Text Object Attribute dialog box displays.
6. Choose **Simple Line** or **Arrow Line**.

   Note: Arrow Line has an arrow at one end of the line. A Simple Line does not.
7. Click **OK**.
8. Select the text object and position it where you please. A line is drawn from the new position of the text object to its original position.

Note: You can double-click the text and set the label line in the Text Object dialog box.

Label Styles

The **Text Style** dialog box gives you a number of choices for label and text object styles. You can also change the styles of multiple selected labels at a time.

To make style changes for all the labels, click the **Style** button in the Label Options dialog box to display the **Text Style** dialog box.

To change the styles of a selected label or labels, select the label(s) and either on the **Options** menu, click **Text Style**, or click the **Text Style** button in the Drawing toolbar to display the Text Style dialog box. If you change the styles of multiple labels at once, hold down the **Shift** key as you select each label.

Make the style changes you want. When you return to the map, the selected labels display with the style changes you specified. The available styles are explained in the next table.

Option	Description
Bold	Uses bold text to create the label.
Italic	Uses italic text to create the label.
Underline	Places a line underneath the text.
All Caps	TEXT DISPLAYS IN ALL CAPITAL LETTERS.
Shadow	Creates a shadow behind the text. (not shown)
Expanded	A space is placed between each character in the label or text object.

There are also three background options.

- Click **None** to have no background.
- Choose **Halo** to create a halo effect around the text. This puts the text into relief from whatever it covers (for example, part of a region, or a street, etc.).
- Click **Box** to create a background box behind the text.

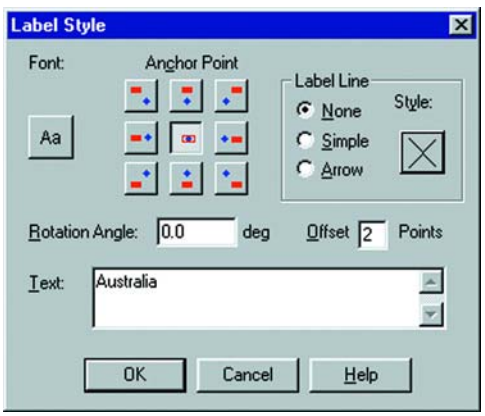
When you choose either the **Box** or **Halo** backgrounds, the **Color** list is activated. Click it to display a palette of colors for the halo or the background. The color you choose corresponds to the button that is currently activated. The color displays in the box and in the Sample. Click **OK** to accept a color.

Labeling Interactively

Although you will probably do most of your labeling automatically, you will need interactive labeling to edit and create individual labels.

Editing Labels

It is very easy to edit individual labels, either those you have displayed automatically or those you have created interactively with the Label tool. Using the Select tool, double-click the label. The Label Style dialog box displays. The changes you make in Label Style dialog box apply only to the selected label. Changes you want to apply to all the labels must be done through Layer Control in the Label Options dialog box.



The Label Style dialog box allows you to make changes to the text, position, and angle of the labels. You can also make changes to callouts, add, or delete them.

To change the label content, simply type the new label text into the Text box. The other controls in this dialog box work the same way as in the Label Options dialog box.

Moving a selected label is the same as moving other objects; simply drag them with the mouse. If you move a label that has a callout, the line will reappear automatically after you move the label.

You can also rotate the label manually about its anchor point. When you select the label, use the rotation edit handle that appears to the lower right of the label.

- For more information, see *Moving Labels You Created Manually* in the *Help System*.

Using Text Objects as Labels

While labels in MapInfo Professional are attributes of the map layer, text objects look like labels but behave like other annotations you draw on the map. They are stored in the Cosmetic layer, and you can save them to a table.

The Labeler tool in the MapInfo Professional Tool Manager helps you use text objects to perform several common labeling tasks:

- Convert labels into text objects, so that they can be saved in a permanent table.
- Create labels for only the currently-selected objects.
- Draw text objects one at a time using the **Text Label** button. This allows you to create multiple annotations for a single map feature, which is something you cannot do using labels.

Creating Labels with the Labeler Tool

Use the Labeler tool to create individual labels. First, make sure that the layer containing the objects you want to label is selectable. Click the Labeler tool to activate it, and click a map object. MapInfo Professional labels the object with the column or expression you specified for that layer in the **Map** menu, point to **Layer Control** and click **Label Options** dialog box. Remember that InfoTips are active for the Labeler tool, so you can view the object's label before you actually label the object.

- For more information about the Labeler tool, see the *Tools* section of the *Help System*.

Saving Labels

Whenever you manually edit automatic labels (including deleting using the **Edit** menu, and click **Clear** or press the **Delete** key), change the settings on automatic labels, or create labels with the Label tool, you will need to save your map to a workspace to have them display in your next session.

For example, label settings are deactivated by default. You check the **Auto label** attribute in Layer Control to display automatic labels on your map and do not save the change when you close the table. The next time you display your map, the labels do not display because the settings go back to the defaults. As with the other Layer Control options, label settings are temporary unless you save the table to a workspace.

Manually edited labels and labels created with the Label tool behave differently. These are edits to the table, not temporary settings. If you close a window or a table and you have label edits pending, MapInfo Professional will specifically prompt you to save the session to a workspace.

This also applies to labels you have deleted using the **Edit** menu, click **Clear** or press the **Delete** key. You may not have any labels visible on your map, but because deleting a label is an editing operation, MapInfo Professional will ask you if you want to save the edits to a workspace.

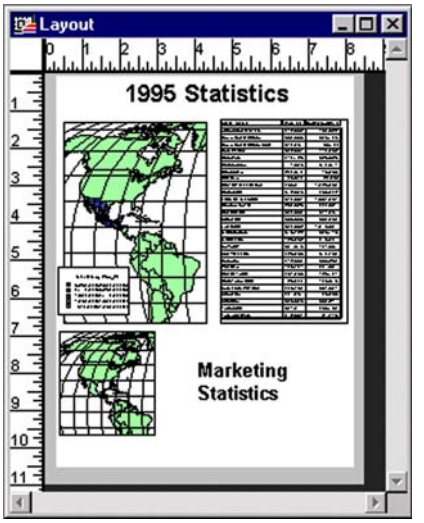
- For more information, see *Removing Labels* in the *Help System*.

Working with Layouts

Once you have created the perfect map, MapInfo Professional® gives you the tools you need to create high-quality presentations or output. Using the Layout window, you can create and customize a page layout that shows off your maps, browsers and graphs.

What is a Layout Window?

MapInfo Professional's Layout window is a page layout feature that allows you to combine your Map, Browser and Graph windows on a page and arrange them for output. You can add any currently open window to the layout and move and resize it to find the best look to show off your work. Add text such as titles and labels to pull the entire presentation together.



While you can print individual Map, Browser, and Graph windows directly without the Layout window (on the **File** menu, click **Print**), you can only print a thematic legend by first adding it to a Layout window. You can also print the data contained in the Info tool, statistics and message windows from the Layout Window.

The Layout window is available as soon as you open MapInfo Professional. On the **Window** menu, click **New Layout** window to access it. When the Layout window is active, MapInfo Professional puts a **Layout** menu on the menu bar, allowing access to a number of layout features.

When you add your windows to the Layout window, MapInfo Professional places them inside layout frames. Using frames to hold your maps and browsers allows you to resize and reposition your windows with ease. The contents of the frame match the contents of the corresponding Map, Browser or Graph window.

The Layout window provides dynamic linking between it and a parent window. For instance, if you change the zoom in a Map window, that map will be updated in the Layout window once you make the Layout window active again.

The rest of this chapter is devoted to learning how best to create a layout, move around in the Layout window, and customize your layout using a variety of options.

Working in the Layout Window

The Layout window functionality includes a number of options to help make it easier to design and create your layouts.Adding a Maximized Window to a Layout

You can put a maximized Map window into a frame in a Layout. The frame object's dimensions are created according to the Map window's size instead of the page layout size. MapInfo Professional also allows the map's image to completely fill the frame, preserving the map's center and zoom settings. If you double-click on the frame, you will notice that the Frame Object dialog box has a check box: **Fill Frame with Contents**. This allows the map image to fill the entire frame. The box is checked by default for all Map windows in frames.

Aligning Objects in the Layout Window

To align one or more objects in the Layout window:

1. Do one of the following:
   - Choose one object
   - Hold down the **Shift** key and click several objects
   - In the **File** menu, click **Select All** to select all of the objects in the Layout
2. Choose **Layout > Align Objects**. The Align Objects dialog box displays. Use the dialog box's drop-down lists to specify your vertical and horizontal settings.
3. Choose the desired horizontal and vertical settings.
4. Click **OK**. The selected objects align according to the settings you specified.

Note: Your alignment settings are saved from one use to the next within a session. Be sure to check both the vertical and horizontal settings before you click **OK**.

Getting Around in the Layout Window

The Layout window includes a rule along the top and left side of the window to assist you when resizing and positioning frames. To hide the rule, on the **Layout** menu, click **Options**. The Layout Display Options dialog box displays. Clear the **Show Rules** check box.

If you are creating a multi-page layout, MapInfo Professional displays the page breaks by default. If you wish to turn off the page breaks, clear the **Show Page Breaks** box in the **Options** dialog box.

Controlling Zoom Level

MapInfo Professional displays the Layout window at a zoom level that is a fraction of the actual size of the printed layout. The zoom level is represented as a percent of actual size in the lower left corner of the status bar.

In order to better position or resize layout objects, you may want to change the zoom level of the Layout window to see more detail. Keep in mind that you are changing the overall zoom of the Layout window, not the zoom of individual windows in frames. (If you want to change the zoom level on a frame containing a Map window, change the zoom for the Map window itself.)

There are four ways to change the zoom level of the Layout window:

- Use the Zoom-in and Zoom-out tools. These tools work exactly as they do in the Map window. You can click the Layout window with the tools or draw a marquee box around the areas of the Layout window.
- On the **Layout** menu, click **Change Zoom** to set the zoom. You can set the zoom anywhere between 6.3% and 800%.
- Use the number keys (1–8) on your keyboard to set the zoom level. As the numbers increase, the zoom increases geometrically. For example, press 1 to get a zoom of 6.3%, press 2 to get a zoom of 12.5%, and press 3 to get a zoom of 25%. (Remember to use the number keypad, and make sure **Num Lock** is on.*)*
- Use the View commands in the **Layout** menu: **View Actual Size**, **View Entire Layout**, **Previous View**.

Ordering Overlapping Objects

You may add enough windows to the Layout window to cause objects to overlap one another. In the Layout window all objects are ordered from front to back. Think of them as being stacked in the Layout. When you draw a new object, it is automatically the front most object, even if it is not overlapping any other objects in the layout.

In order to display your objects properly, you may need to bring an object forward in front of other objects.

You can use the Bring to Front and Send to Back commands to change the order of objects. Click an object with the Select tool. Choose the Bring to Front option to move the object into the foreground. Choose the Send to Back object to move the object into the background.

When you select an object using the **Ctrl** key along with the Select tool, MapInfo Professional selects the object one layer down. Selecting again chooses the next layer.

Before You Create a Layout

The first step in generating quality output is creating good Map windows. MapInfo Professional is set up to do a great deal of on-screen data entry, object editing, geocoding, and geographic analysis. There are many windows available to work with that can be easily arranged on the screen. When you prepare any MapInfo Professional window for output using a Layout window, you must change the way you think of using MapInfo Professional.

For example, in a MapInfo Professional session, if you want two views of a map, you may simply use the Grabber tool and shift to a different location, and then return via **Map** menu (click **Previous View**). To get two views of the same map for a Layout, you must have two separate Map windows. There are many techniques that can be used to prepare the windows to make output easier.

Creating Multiple Views of the Same Map

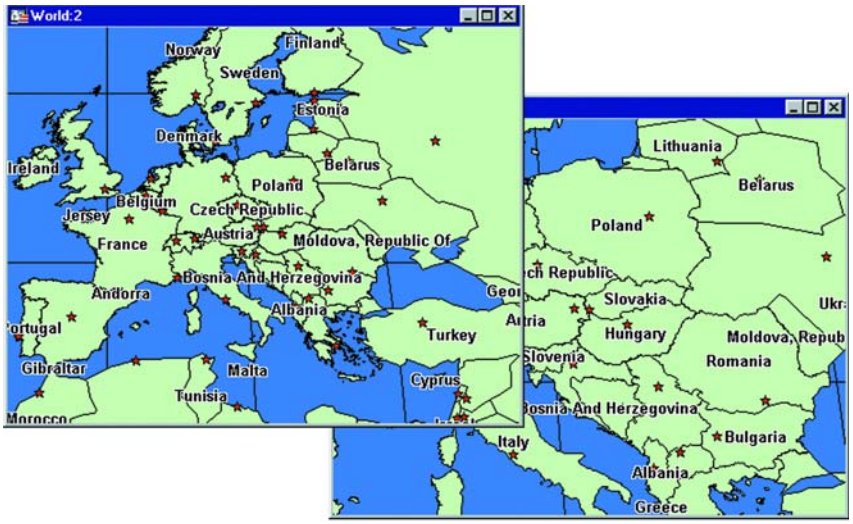
One very popular way to display maps is to have a detailed map with an inset of an overview map representing the general area. For example, government planners have a detailed flood plain map thematically shaded for an area around a major city. They want to include an inset map showing the location of that city in relation to the entire region. We can simulate this exercise with the WORLD.tab table included with MapInfo Professional.

Note: Some of the files described in this example may refer to MapInfo Professional Tutorial data, which is available on the MapInfo web site, www.mapinfo.com/miprotutorial.

To create multiple views of the same map:

1. Open the WORLD.tab and WORLDCAP.tab tables from the MapInfo/Data/World directory. The tables display in a Map window.
2. Choose the area you want to show in detail and zoom in on it. The Map window contains the detailed view.

3. As stated previously, there must be a separate Map window for each view you want to include in a layout. Instead of re-opening the tables to re-create the Map window, on the **Map** menu, click **Clone View** to create a duplicate Map window.
4. A new Map window displays. Zoom out on this map to create the overview map.



The new Map window is independent of the original Map window. You may add or remove layers without changing the original map.

Getting Labels Right for your Layout Window

There are many considerations in getting labels to look good on your maps. As with changing views of the map, there is a significant difference between using labels in a MapInfo Professional session and using them in a layout. Labeling in a MapInfo Professional session is best handled using the **Auto Label** check box in Layer Control.

When you create a map to place in a Layout window, you usually need to spend more time making your labels look aesthetically pleasing. It is also more likely that you will want to save these labels to a separate layer. With the default labeling, label styles can be changed; however, customized labels are not saved in their own layer for future use or editing. To create labels that can be easily saved, use Autolabel.mbx or Labeler.mbx. These MapBasic applications allow you to create labels that can be saved to a separate layer for future use.

- For instructions on using the AutoLabeler tool, see the *Tools* section of the *Help System*.

Creating a Layout Window

Creating a layout involves adding your Map, Legend, Graph, and Browser windows to the Layout window, positioning these items where you want them, and adding any annotations such as text and titles so that your final layout presents the message you want to send.

You bring your windows into the Layout window by adding them to placeholders, or frames. A frame is a graphic object through which you can view a window. Each frame may contain the contents of one Map, Graph, Browser, or Legend window.

First, decide what you want to put in the Layout window. You can choose whether you want to display all, some, or none of your open windows.

To create a Layout window:

1. Choose **Window > New Layout Window**.

   When no windows are open, MapInfo Professional creates a blank Layout. When there are windows open, MapInfo Professional displays the New Layout Window dialog box.

2. Choose one of the options.

Situation	Description
One Frame for Window	MapInfo Professional places a single open frame in the center of the layout. You select the contents of this frame through the drop-down menu that lists all open windows. If you choose a Map or Graph window from this list and there is an active map legend, MapInfo Professional automatically places the legend in the layout. You can reposition or delete this legend from the layout. Legends are positioned in the same way as Map, Browser, and Graph windows. Their relative locations are preserved on the screen.
Frames for all Currently open Windows	This option tells MapInfo Professional to place all open windows in the layout. Since MapInfo Professional places windows in the approximate location and size as they appear in the MapInfo Professional window, you should arrange and size the windows before you bring them into the layout.
No Frames	If you prefer, you can create a blank layout by choosing the No Frames option. If you do not have any windows open, choosing New Layout Window automatically creates a blank layout. The New Layout Window dialog box does not display.

   Since a frame is a graphic object, you can:

   - Reposition it using the Select tool.
   - Change its fill, and the line style of its border.
   - Copy or cut the frame and paste it into another Layout window.

   You can also position frames so that they overlap one another or overlap other graphic objects. To change which window is displayed in a frame, double-click the frame with the Select tool. Use the drop-down list in the Frame Object dialog box to change the frame's contents.

3. Click **OK**. MapInfo Professional opens and displays that Layout.

When MapInfo Professional first opens a Layout, it sets the page size and orientation (portrait or landscape) according to the current setting for your printer. The current setting for your printer is determined by the printer specifications designated in **Options > Preferences > Printer**. You can change the printer settings for the active Layout window through **File > Page Setup**, or by using the **Set Window Printer** command in the MapBasic window. When you later open that Layout when the printer setup is different, the Layout uses the page size and orientation for that printer setup. The sizes and positions of objects in the Layout are the same, but the way the Layout is broken into pages is different.

After you create a Layout, that Layout is the currently active window. MapInfo Professional places the Layout menu item on the menu bar. Use the Layout menu to choose options for working with Layouts.

Adding a Maximized Map Window to a Layout

You can place a maximized Map window into a frame in a Layout. The frame object's dimensions are created according to the Map window's size instead of the page layout size. MapInfo Professional also allows the map's image to completely fill the frame, preserving the map's center and zoom settings. If you double-click the frame, you will notice that the **Fill Frame with Map** check box in the Frame Object dialog box is checked. This allows the map image to fill the entire frame. The box is checked by default for all Map windows in frames.

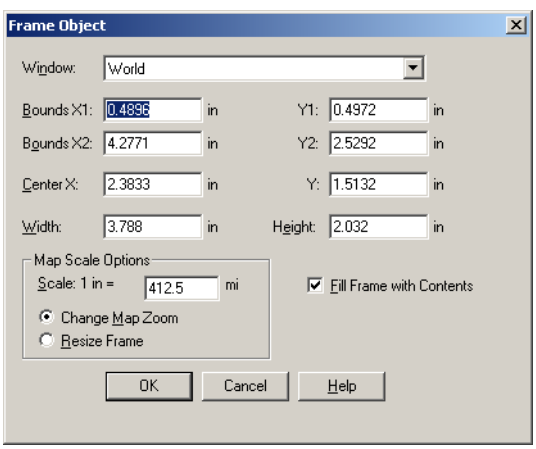
Adding a Map to a Layout

After you have created a layout, you may decide that you want to add other maps to it. You do not have to create a new layout to do this. You can create frames by hand to contain other windows. Use the Frame tool to draw window frames where you want them. The Frame tool is available whenever the Layout window is active.

Note: If you draw a frame when no windows are open, MapInfo Professional places a blank frame in the Layout window.

To add a window to a layout you are already working with:

1. Click the **Frame** button in the **Drawing** toolbar and the cursor becomes a small cross.
2. Move the cursor to where you want to begin drawing.
3. Click and hold the mouse button and drag the cursor diagonally until the dashed box outlines the area where you want the frame.
4. Release the mouse button. When there are no windows open, an empty frame displays with "No Window" inside. When there are one or more open windows, the Frame Object dialog box displays.



This dialog box is slightly different for each type of frame. The Map Scale options are only available when you select a Map window in the frame.

Note: The **Fill Frame** check box does not display for Browser, Cartographic Legend, and Graph windows.

The Frame Object dialog box allows you to change the width, height, and center of the frame and to set a specific scale for a map. When there are several windows open on the screen, MapInfo Professional displays its choice in the **Window** drop-down list. This list allows you to choose which window you would like in your frame.

5. In the **Window** drop-down list, select the window you want to add and review the options for creating this frame.
   - **Bounds X1 and 2, Bounds Y1 and Y2** — Use these fields to define the x and y boundaries for the new frame. When you change bounds entries, the Center, Width, and Height entries change accordingly. When you change the bounds entries, the **Map Scale** changes as well.
   - **Center X, Y** — Use these fields to define and adjust the center point of your new frame.

   Note: When you make a change to the **Center X** or **Y** entries, the **Width** and **Height** bounds do not change.

   - **Width, Height** — Use these fields to define and adjust the width and height of the new frame.
   - **Change Map Zoom** — Click this radio button to implement the correct map scale without changing the size of the frame. This option changes the zoom of the actual Map window so that the Layout frame is in the correct scale. This option is selected by default. Type the scale you want within this frame in the Scale. The units are set by the Paper Unit setting in the System Preferences dialog box.

   Note: Changing the map scale with this option will not change the values in the Bounds fields or the Width and Height fields because there is no change to the size of the frame, only the look of the map within the frame. To undo the change to the map zoom, return to the Map window and click **Previous View**.

6. Select one of these options:
   - **Resize Frame** — Click this radio button to change the size of the frame based on the data you enter into the Scale field. When you change this entry, the bounds, Center, Width, and Height entries change accordingly.
   - **Fill Frame with Contents** — Click this check box to display as much of the Map window as fits in the frame. When you do not select this button, the frame may be only partially filled but it will have the same contents as the window it contains.
7. Click **OK** to choose MapInfo Professional's choice and that window is placed into the frame.
8. Choose a window from the dialog box's **Window** drop-down list.
9. Click **OK** and the window is placed in the frame.

Note: When you click the **Change Map Zoom** or **Resize Frame** radio button, you set your selection as the default for the rest of the session. If you change it during the session, the change becomes the default.

Once you have created a frame, you treat it much like any other graphic object. You can change its size and position, its line style and fill pattern, and you can cut, copy, and paste it.

- You can access instructions for making a frame transparent in the *Help System*.

Using Legends in a Layout

You can use both cartographic and theme legends in your layout. Both types of windows display in the layout at the same size as they do on the MapInfo Professional desktop.

When you resize a legend frame to make it smaller, it crops the legend rather than shrinking it to fit. The text styles (for example, font, size) used in the cartographic and theme legend windows are preserved in the layout.

Adding a legend to the Layout window is a different process, depending on the type of legend. You can add a theme legend to a layout even when no theme legend displays in the MapInfo Professional desktop.

To do this, make sure the Layout window is active and click the **Frame** button.

1. In the Layout window, click and drag to draw the frame for your theme legend. When you release the mouse, the **Frame Object** dialog box displays.
2. In the **Window** drop-down list, select the theme legend and click **OK**. The theme legend displays in the layout frame. This is also how you add other types of windows on your desktop to the current layout.

   In cartographic legends, you must create the legend on your desktop (on the **Map** menu, click **Create Legend**) before you can add it to the Layout window.

Moving Frames in a Layout Window

Once you have brought in the windows you wish to include in the layout, you can reposition or resize them to create a professional looking product.

To move a frame:

1. Click the frame with the Select tool and hold down the mouse button.
2. When the cursor becomes a four-headed arrow (after about one second), drag the frame to the new location and release the mouse button.

Aligning Objects in a Layout Window

MapInfo Professional includes a command to help you perfectly align objects in the Layout window. You can align objects to each other horizontally and vertically or to the Layout window itself.

Choose the objects you want to align and on the **Layout** menu, click **Align Objects**. The Align Object dialog box displays.

Specify the appropriate vertical and horizontal alignment. Choose from the following options:

Horizontal Alignment	Vertical Alignment
Don’t change alignment	Don’t change alignment
Align left edges of	Align top edges of

Horizontal Alignment	Vertical Alignment
Align center of	Align center of
Align right edges of	Align bottom edges of
Distribute	Distribute

Each alignment can be performed with respect to each object or to the entire layout. When you choose the entire layout, the objects are aligned with respect to the top, bottom, left, and right edges or margins of the layout.

If you want to align objects with respect to each other, the objects are aligned with respect to an imaginary rectangle, called the bounding rectangle, that completely encloses the objects. The horizontal and vertical settings you choose position the objects at the top, bottom, left, right, and horizontal or vertical center lines of the bounding rectangle, rather than at the edges of the layout.

The Distribute option tells MapInfo Professional to distribute the vertical and horizontal space between objects evenly. You can perform multiple alignments in one layout.

- For more examples, see *Examples of Aligning Objects in a Layout Window* in the *Help System*.

Setting the Map Scale for a Layout Window

One of the most difficult tasks in generating good output is setting the scale of the map. There are two ways to set the map scale. The first method is to choose **Map** menu and click **Change View**. This scale setting affects the on-screen scale of your map according to your monitor size. This scale setting isn't used as often, because generally the scale on screen does not need to be exact. Use the on-screen scale when you are making a presentation that will be viewed directly in MapInfo Professional.

Note: The Map Window Preference setting **Use Cartographic Scale** affects the entries in the **Change View** dialog box.

Accurate scale is more important on the printed map. To get the correct scale for output, you must coordinate the Map window with the Layout window. You must also decide on the desired end result. For example, you may want a map that has a 1:25000 scale and fits in a nine inch Layout frame. If this is the case, you will have to alter the zoom level of your map to fit these conditions. Or, in the case where you must show a set distance across the map, you may have to allow for a larger page size. The following two formulas will help you set the right map zoom, scale, and frame width.

Limiting Frame Size When Setting the Layout Scale

The following formula calculates the zoom that must be set in your Map window in order to have a map meet set scale and frame width criteria.

```
((Frame Width in Inches * Scale)/12) /5280 = Map Zoom in Miles
```

For example, you need to make a map that will be in a scale of 1:24000 and fit in an eight inch frame. You need to determine the zoom level that will accommodate the map scale and frame width. Calculate the following:

```
((8 * 24000) / 12) / 5280) = 3.03
```

On the **Map** menu, click **Change View** and enter **3.03** miles as your new zoom level.

Limiting Map Zoom when Setting the Layout Scale

The following formula calculates the number of inches to make the frame for a map in order to meet set scale and zoom level criteria.

```
(Map Zoom in Miles * 5280 * 12) / Scale = Necessary Frame Width
```

For example, you need to make a map that will be in a scale of 1:100000, and you must view a twenty mile zoom level. You need to determine the frame size that will accommodate the scale and zoom. Calculate the following:

```
(20 * 5280 * 12) / 100000 = 12.67
```

Your frame needs to be 12.67 inches wide. If your printer is not large enough to handle this, change your layout size to spread over two pages.

- For more information, see *Creating a Simple Scale Bar* in the *Help System*.

Cloning a Map View

You can create a second view of your map with the **Clone View** command. Clone View creates a duplicate Map window that you can then alter to create a different view of your map, for example, a street map of a city and a zoomed in view of a major intersection, or use a different kind of thematic analysis for each view. It is particularly useful when you are creating a Layout and you want to present side-by-side views of the same location.

Note: Cloned windows in a workspace are written as MapBasic commands to the .WOR file. These command statements cannot exceed 32,000 bytes.

Now that you have completed your professional looking layout, printing is a simple matter.

Creating a Cartographic Legend

You can utilize the cartographic legend feature in a variety of ways. This feature enables you to create a legend for any map layer(s) in your Map window. Many of the elements in the cartographic legend and legend window can be customized, allowing you to enhance your map presentation. You have the added proficiency of being able to use the table metadata in your cartographic legend text as well as save legend attributes to the metadata. You are also able to align all of the legend frames in your Map window. Furthermore, the cartographic legend feature has the ability to join tables “on-the-fly”, thus allowing you to obtain legend feature descriptions from another table while you are creating the legend.

What is a Cartographic Legend?

Cartographic legends are based on the map layers in your Map window. Each legend in the legend window corresponds to a layer on the map, and each legend is enclosed in a legend frame within the legend window. The attributes for each legend frame, such as the title and label styles can be derived from several sources. These are:

- Map table metadata
- Map table attributes
- Joined tables
- Manual creation

A legend frame is another way to refer to a particular layer's legend. You can create an individual legend window for each layer in your map, or you can have several legend frames in one legend window. The properties for each legend frame can be edited individually.

- For instructions, see *Creating a Cartographic Legend* or *Changing a Cartographic Legend* in the *Help System*.

Steps to Creating a Cartographic Legend

To create a legend, follow these steps:

1. *Selecting Layers*

   The layers listed in the Legend Frames group of the **Create Legend – Step 1 of 3** dialog box are all the layers that will be included in your legend. All the layers in your Map window are included by default.

2. *Defining Window Properties and Frame Defaults*

   In Step 2 of the Create Legend wizard, you specify the settings for your Legend window and the default settings for the legend frames.

3. *Legend Attributes*

   The Create Legend wizard allows you to create attribute-driven legends. This makes creating text descriptions easier because they can be automatically generated from values in an attribute column. In addition, the process by which the legend is generated can be saved to the map table metadata in the underlying map layer, or from a joined table. The metadata is then used as the default attribute settings for the selected legend frame. These settings can be different for each frame. The metadata defaults override the Legend Frame defaults in Step 2 of the wizard. If no metadata keys exist in the table, the Legend Frame defaults from Step 2 are used as the default values.

- For more information and related topics, see *Creating a Cartographic Legend* and *Saving Legend Attributes to Metadata* in the *Help System*.

Printing and Exporting Your Results

This section covers the printing and exporting options in MapInfo Professional.

Printing Your Project

When you need to create presentation materials, you can print out the MapInfo Professional layouts you have created.

Page Setup

First check that your page setup is what you want. Any changes to the page setup will likely affect the layout, so it is a good idea to view the effect of the changes on your layout before printing. On the **File** menu, click **Page Setup**. Here, you can specify the page orientation (portrait or landscape) and margins. You can also specify the paper size and its source.

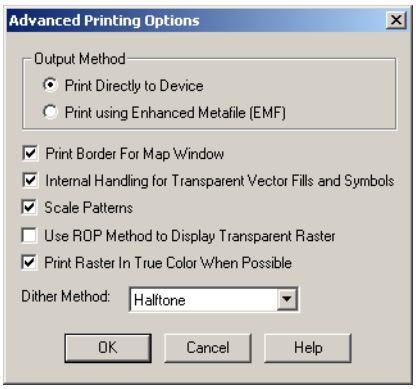
In addition, you can override your default printer setting and choose a different printer for this print job. Click the **Printer** button to display the **Page Setup** dialog box for your printer. The printer that initially displays is the default printer that you set in the Printer preferences (on the **Options** menu, point to **Preferences** and click **Printer**). This will either be the Windows default printer, or the MapInfo Professional preferred printer that you selected. Make any changes you want to the printer and its properties, and click **OK**. The settings available in the Printer Properties dialog box will vary according to the printer you are using.

Printing Options

Changes you make to these settings override the default settings from the Output Preferences.

When you are ready to print:

1. Make sure the Layout window is active. On the **File** menu, click **Print**. The Print dialog box displays.
2. Choose the number of copies you want to print and whether you want all pages or a specific range of pages to print. As in the Page Setup dialog box, the Print dialog box also allows you to override the default printer settings.
3. Click the **Name** drop-down list in the **Print** dialog box to select a printer. All of the printers available on your system display in the list. You can specify printer properties here as well, plus specify whether to print to a file.
4. To use the advanced print settings to take advantage of additional output options that help you control transparency and color, particularly for raster images, click the **Advanced** button. The Advanced Printing Options dialog box displays.



a. Indicate whether you want to print your Layout using the Enhanced Metafile format, or Print Directly to Device.

b. Indicate how you want to handle transparency. If you have transparent vector fill patterns and symbols, check the **Internal Handling for Transparent Vector Fills and Symbols** box to have MapInfo Professional handle the transparency internally.

If you are using transparency in a raster image, clear the **Use ROP Method to Display Transparent Raster** box to have MapInfo Professional handle the transparency internally. The image will be broken down into small rectangular regions that do not contain transparency. It is recommended that you check this option because printers do not always handle transparent raster images correctly. This method may produce large plot files.

c. If you are using 24-bit, true color raster images, select the **Print Raster in True Color When Possible** check box, and select a dither method from the **Dither Method** list.

Note: The **Print Border for Map Window** check box is not available for Layout windows. You can control the border for each frame by selecting the frame and setting by selecting the **Options** menu, clicking **Region Style**.

d. Click **OK** to return to the **Print** dialog box.

5. Click **OK** to print.

More and more often, users want to export their maps electronically to files rather than print them.

Exporting a Layout

The easiest way to make electronic copies of maps and layouts from MapInfo Professional is to use the Save Window As command. You can export to Windows Bitmap, Windows Metafile, Windows Enhanced Metafile, JPEG File Interchange Format, JPEG 2000, Portable Network Graphics Format, Tagged Image file Format (TIFF), CMYK, and Photoshop 3.0. When using the Save Window As command, keep in mind that all additions and edits must be made in the Map window. When you have the Map window the way you want it, then create the Layout window. You can use the advanced export options to produce better quality output. The same transparency and raster options are available when you print your Layout as when you export the Layout. Click the **Advanced** button in the Save Window As dialog box to display the Advanced Exporting Options dialog box. The same check box settings are available.

Changes you make to the Advanced Export settings override the default settings in the Output preferences. See **Setting your Output Setting Preferences in Chapter 3 on page 130** for more.

Save Window As Supports Raster Formats

You can save your map images as GIF, TIFF LZW, and TIFF CCITT Group 4 images.

To save your data as a raster format:

1. Open a Map, Layout, Browser or Graph window you want to save in the new format.
2. From the **File** menu, click **Save Window As** to display the Save Window to File dialog box.
3. Select the type you want to save it in from the **Save as type** drop-down list.
   - GIF
   - TIFF LZW
   - TIFF CCITT Group 4
4. Type the name of the file in the **Filename** field and click **Save** to save your entries.

Creating an Encapsulated Postscript File

If the available Save Window As formats are not appropriate for your needs, or you want to use the options in the Layout window, you may want to send your output to an encapsulated postscript (EPS) file. This file type is widely used by service bureaus and print shops. There is not a set export or save command for EPS files. You must set up a postscript printer driver and print the map or layout to a file.

1. From the Windows Control Panel, select **Printers**.
2. In Printer Setup choose **Add Printer**. The Add Printer Wizard displays.
3. Follow the wizard for the setup. Choose a postscript printer from the printer list, and select FILE as the available port. Enable the option to specify EPS.
4. Once the postscript driver is installed on your system, use that printer to print the map or layout to a file from MapInfo Professional.
5. From the **File** menu, select **Print**. The Print dialog box displays.
6. Under printer name, select the postscript printer. Click **OK**.
7. The Print to File dialog box displays. Give your file a name and choose **Save**.

Smoothing the Edges of Images During Export

To give you more control over map images when exporting MapInfo Professional maps, you can use anti-aliasing methods. This is particularly important when you are saving maps created in MapInfo Professional for use in other Windows-based applications, in particular in slide presentations or for web pages.

We have added the ability to smooth or anti-alias images during the export process. You can use this capability with all types of windows such as Map windows, layouts, legends, and graphs.

Note: You cannot anti-alias images you are exporting to .EMF or .WMF format, because these are not true raster formats.

There are three smoothing options you can use to customize your raster image:

1. *Smooth using a Filter value*. You can set a flag that selects one of six filters that allow you to choose the direction the filter is applied to the image from.
2. *Smooth using a Mask value*. You can select a value that indicates the size of the area you want to smooth. For example, to create a 3x3 pixel mask value, you would enter a 3 in this field. This would limit the amount of change in the color of the pixels. Typically mask sizes would be 2-3 pixels when exporting at screen resolution. If you are exporting at a higher resolution, a larger mask might be appropriate.
3. *Smooth using a Threshold value*. You can select a threshold value to indicate which pixels to smooth. Each pixel in an image has a value based on its color. The smaller the pixel value, the darker the color. Select this option to smooth all of the pixels above the threshold you enter in this field. When you set this value to 0, MapInfo Professional will smooth all of the pixels.

You must either set a global preference for these anti-aliasing options or set them locally during the export process (using the Advanced button).

To set the anti-aliasing preference for exporting images:

1. From the **Options** menu, select **Preferences** and **Output Settings** to display the Output Preferences dialog box.
2. Click the **Exporting** tab to display the anti-aliasing options.
3. To use anti-aliasing automatically, select the **Use Anti-aliasing** check box and select from these options:

   Smooth using a Filter value

   Choose a filter for the smoothing you want to use. Select from these filters:

   - Vertically and Horizontally (Smooths the image vertically and horizontally)
   - All Directions (1) (Smooths the image in all directions)
   - All Directions (2) (Smooths the image in all directions using a different algorithm)
   - Diagonally (Smooths the image diagonally)
   - Horizontally (Smooths the image horizontally)
   - Vertically (Smooths the image vertically)

Smooth using a Mask value

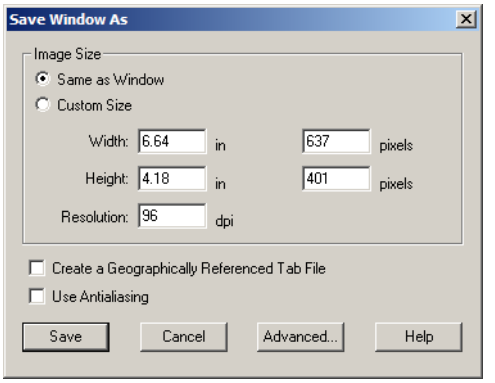
Choose the pixel size of the mask you want MapInfo Professional to use in this field. For example, to create a 3x3 pixel mask value, you would enter a 3 in this field. This would limit the amount of change in the color of the pixels to the three pixels around the basic pixel.

Smooth using a Threshold value

Select a threshold value to indicate which pixels to smooth. Colors are 0 for black and 255 for white (in an 8 bit image). Entering a low number changes the look of your map by smoothing the darker colors and the lighter colors. Choosing a higher number changes the way the lighter colors display.

To set the anti-aliasing options locally during export:

1. When you have completed your work on a window, select the **File > Save Window As** menu option. The **Save Window to File** dialog box displays.
2. Type the name and indicate the path of the file you are saving in this dialog box. Click **Save** to continue. The **Save Window As** dialog box displays.



*If you are exporting an EMF or WMF image, the **Use Anti-Aliasing** check box is disabled.*

3. Select the **Use Anti-aliasing** check box and do one of the following:
   - Click **Save** to use the anti-aliasing options you selected in the Output Preferences dialog box
   - Click **Advanced** and choose new anti-aliasing options for this particular map. Click **OK** to return to the Save Window As dialog box. Click **Save** to save these settings and the file.

   Note: If you do not select the **Use Anti-aliasing** check box, the anti-aliasing options in the Advanced Exporting Options dialog box are disabled.

13

Registering Raster Images

Raster images can provide context to your maps by giving them detail and definition. This chapter reviews the details of registering and working with raster image files.

In this Chapter:

- Working with Raster Images 430
- Opening a Raster Image 433
- Printing/Exporting Translucent Raster Images 438

Working with Raster Images

There are a number of ways you can obtain raster image files. If you have a scanner and scanner software, you can use the scanner to create raster image files. MapInfo Professional can read and display the raster image files created with the scanner software.

Some graphics software packages let you save or export images into raster file formats, such as TIFF (Tagged Image File Format). So if you can create a TIFF file with your draw or paint package, you can display it in MapInfo Professional.

You can also purchase raster images from MapInfo Professional or other commercial vendors. Some data vendors also offer scanning services.

Determining Map Coordinates

When registering your raster image, you need to know the map coordinates that correspond to your image. If your raster map image shows a graticule (a grid of longitude/latitude lines), you can determine map coordinates by noting the longitude/latitude labels along the graticule.

If your map does not show a graticule, you may be able to determine map coordinates by locating prominent map features, for example, the Northwest corner of a region, and then using another MapInfo Professional table as a reference to determine the coordinates of those prominent features. For a discussion of this process, see *Choosing Control Points from an Existing Map* in the *Help System*.

An Introduction to Raster Image Registration

What Is a Raster Image?

A raster image is a type of computerized image that consists of row after row of tiny dots (pixels). If you have a scanner and scanner software, you can create a raster image by scanning a paper map. After you scan a map image and store the image in a file, you can display the file using MapInfo Professional.

There are many different raster image file formats. MapInfo Professional can read the following types of raster image files: JPEG, GIF, TIFF, PCX, BMP, TGA (Targa), and BIL (SPOT satellite).

What Does It Mean To Register a Raster Image?

When you register a raster map image, you enter map coordinates (e.g. longitude/latitude degrees), and you indicate which locations on the raster image correspond to those coordinates. You must register each raster image before displaying the image in MapInfo Professional, so that MapInfo Professional can perform geographic calculations, such as distance and area calculations, when displaying the raster map.

The first time you open a raster image file within MapInfo Professional, MapInfo Professional displays the Register Raster Image dialog box. By completing this dialog box, you tell MapInfo Professional how to register the raster image and determine the coordinate system for the image.

MapInfo Professional stores the raster image's registration information in a table file for future re-use. The next time you run MapInfo Professional, you can re-open the raster table without repeating the registration process. Thus, you only need to register each raster image once.

Raster image files provided by MapInfo Professional are already registered. You do not need to perform the registration process when you display the sample raster data included with MapInfo Professional.

Understanding Raster Images in MapInfo Professional

Using raster image files, you can bring paper maps, photographs, and other graphic images into MapInfo Professional. For example, if you work with paper maps, you probably want to use those paper maps as the foundation for the maps you create in MapInfo Professional. Once you scan your paper map into a raster image file, you then can display it in a Map window.

Using Raster Images As a Backdrop for MapInfo Professional Maps

Using a raster image as the base layer of your map gives you a detailed backdrop for your other map layers. You can easily change the size, scale, or center point of the displayed image. For example, if you want to enlarge part of the image, use the Zoom-in tool. Keep in mind, however, that as you increase the image's size, the display will become grainier if you exceed a 1-1 pixel ratio. Each pixel in the image becomes more distinct, causing the image to look more like a series of blocks instead of the intended picture.

Using Raster Images As a Stand-Alone Image

You may have a satellite image of topography that would be impossible to duplicate as a vector image that you want to use for a presentation. You can display the image in MapInfo Professional and then incorporate it into a page layout.

Map Editing with Raster Images

Once you have superimposed map layers on top of your raster image, you can use the raster image as a reference while you edit your map layers. The process of editing based on a screen image is known as *heads-up digitizing*. (To minimize image distortion, only digitize from map images with known projections or rectified aerial photographs.)

Placing a Logo on a Page Layout with Raster Images

Most raster images displayed in MapInfo Professional are images of paper maps or aerial photographs, but almost any image can be scanned and made into a raster image. For example, with an image like your company logo, you can open and display the raster file in MapInfo Professional without registering it because control point coordinates are irrelevant. You can then place it in a frame in a Layout window and incorporate the logo into your page layout.

Raster Image Format Details

There are many different raster image file formats. MapInfo Professional can read the following types of raster files:

- *filename*.ADF
- *filename*.FLT
- *filename*.TXT
- *filename*.ASC
- *filename*.GIF (Graphics Interchange Format)
- *filename*.JPG (JPEG format)
- *filename*.JP2 (JPEG 2000 format)
- *filename*.TIF (Tagged Image File Format)
- *filename*.PCX (ZSoft Paintbrush)
- *filename*.BMP (Windows bitmap)
- *filename*.TGA (Targa)
- *filename*.BIL (SPOT satellite images)
- *filename*.SID (MrSID format)
- *filename*.WMF (Windows Metafile format)
- *filename*.EMF (Enhanced Metafile) format
- *filename*.PNG (Portable Network Graphics format)
- *filename*.PSD (Photoshop 3.0)
- *filename*.ECW (ECW 2.0 format handler)
- *filename*.GEN (ADRG format)
- *filename*.GEN (ASRP 1.2 format)
- *filename*.* (CADRG format)
- *filename*.* (CIB format)
- *filename*.NTF (NITF format)

MapInfo Professional also supports AirPhotoUSA raster images taken at different elevations for particular areas in the United States. The AirPhotoUSA map handler allows MapInfo users to open and display the imagery contained in AirPhotoUSA Map files as a layer. MapInfo Professional treats these images like any other raster file. The MAPINFOW.PRJ file has been updated to accommodate the AirPhotoUSA changes.

Note: The maximum supported raster image varies by raster handler.

ARC Grid Format Support

MapInfo Professional uses the Arc Grid Handler to use and display of ESRI grid files. You will see the file extension options in the Open Table dialog box when you choose the **Files of Type** option **Grid Image**. This allows you to open both ASCII and Binary Continuous and Classified grid formats but you can only hillshade the Continuous grid files. These types of data files are available from the USGS Seamless Data Distribution System.

Note: The Arc Grid Handler does not support the Arc Grid Export format (*.e00 extension) in MapInfo Professional.

- For more information, see *Color Options for Raster Images* in the *Help System*.

Opening a Raster Image

When you open a raster file you need to register it to identify coordinate point references for the image. Using a vector map as a reference, you identify the coordinates of the vector map and match them with equivalent points on the raster image. This coordinate information allows MapInfo Professional to determine the position, scale and rotation of the image so that you can overlay vector data on top of the image. The coordinate information is stored in a TAB file created during the registration process. The TAB file enables you to re-open the raster file in MapInfo Professional format.

You usually register the image the first time you open it. However, you do not need to register the image if you do not plan to use vector data with it, or if it already contains georegistration information.

Raster images usually fall into one of three categories:

- A fully registered image, containing control points and a projection (for example, GeoTIFF file).
- A partially registered image containing control points, but missing a projection (for example, an image with an associated World file).
- An unregistered image missing control points and a projection.

Once the image is registered, opening it again requires a slightly different procedure. Opening both unregistered and registered images is explained in the next section.

For more information, see these related topics in the *Help System*.

- Opening a Registered Raster Image
- Opening an Unregistered Raster Image
- Opening a Georeferenced Raster Image

Registering the Coordinates of a Raster Image

Before you can overlay vector data on top of a raster image, you must first register the raster image so that MapInfo Professional can position it properly in a Map window. In the Image Registration dialog box, you can identify control point coordinates and specify the appropriate projection for the raster image.

Control points are the coordinates you identify on the raster image that MapInfo Professional can use later to match up to other layers. It is very important to provide accurate control point information when registering a raster image, so MapInfo Professional can display raster images without distorting or rotating them. Later, when you overlay vector data, MapInfo Professional distorts and rotates the vector data so both layers can line up properly. Identifying significant control points makes this match up process easier. We suggest you use highway/street intersections and prominent landmarks as control points, as they rarely move.

Specifying the correct projection of the raster image is also important for accurate display. Images that do not have known projections, such as unrectified aerial photographs, are less suitable for use with vector data.

There are two ways to register a raster image in MapInfo Professional. Each involves specifying the map coordinates of control points on a reference map and matching them with equivalent points on the raster image. To determine map coordinates, you can:

- Identify a point's coordinates from the paper map.
- Determine a raster images control point coordinates on screen and automatically transfer the information to the Image Registration dialog box.

Note: If you scanned in the image from a paper map, the map most likely contains a graticule (latitude and longitude grid). You can choose those coordinates for prominent features and enter them in the Image Registration dialog box.

- For specific instructions, see *Registering the Coordinates of a Raster Image and Choosing Control Points from an Existing Map* in the *Help System*.

Reprojecting a Raster Map

From time to time, you will need to use a raster map registered in one projection in another map in different projection. You can reproject the raster image, that is, change the coordinate system and the way the raster image displays to accommodate the new vector map. Typically, the open map dictates the projection of the successively displayed images. You can also reproject the raster using the projection of a vector table.

Reprojecting a Raster based on a Vector Map

If you are working with registered raster data such as satellite and aerial photo images, scanned maps, grids, seamless tables and WMS data, you might want to reproject that raster data to accommodate a vector map.

MapInfo Professional performs the raster reprojection when you open a registered raster image inside of an existing Map window with a different projection or when you change the projection of a Map window. During the raster reprojection process, MapInfo Professional recalculates the pixel values of the source image to make them display correctly in the destination image. In this resampling process, MapInfo Professional tries to restore every pixel value of the image based on the pixels around it. In MapInfo Professional there are two methods for calculating the pixel values of the destination image: Cubic Convolution and Nearest Neighbor. These are industry-standard terms used by GIS professionals all over the world. These methods are described later in this section.

Due to this feature, these are the precedence rules for Map window projection.

Both vector and raster layers have "equal rights", that is, every new layer (without regard for type) is reprojected into the current Map window's projection. That is, which ever map is opened first takes precedence for projection.

Note: You can change the projection of a Map window containing a mix of raster and vector layers by setting the image processing reprojection preference to *Always* or *Optimized*.

When you are working with palette raster images (like a scanned map), an image might contain all 256 colors. If you display this image in the Adjust Image Styles dialog box and clear the Transparent check box, the color "white" becomes transparent. If you do not want this display behavior, select the Transparent check box and choose another transparent color (using Select Color).

Transferring Vector Map Coordinates Directly to a Raster Map

To transfer the coordinates automatically from a vector map to a raster image, you need a vector map of the same image. Then, you display the vector map side by side with the Image Registration dialog box, which shows a preview of the raster image. Click a prominent feature in the vector map to determine its coordinates and transfer this control point to the Image Registration dialog box.

To transfer a vector map's coordinates to a raster image:

1. On the **File** menu, click **Open** and Raster Image file format.
2. Choose the raster image file and click **Open**. The Display/Register dialog box displays.
3. Click **Register**. The Image Registration dialog box displays. A preview of the raster image appears in the lower half of the dialog box.
4. Choose the **Projection** button to specify the image's projection. If you do not set the projection, MapInfo Professional defaults to Longitude/Latitude or to the default table projection set in the Map Window Preferences.
5. To add control points, click the **Add** button to add a control point entry to the **Control Points** list.
6. Click the **Pick from Map** button and select a location in the Map window that matches a location in your raster image. MapInfo Professional updates the Map X and Map Y fields in the Edit Control dialog box with the new coordinates. Click **OK** to save this entry and close the dialog box.

   Note: When the **Pick from Map** button is disabled, you can select locations directly from the open map. If a map is not open, you can select another tool (like the **Select** tool) and use that tool instead of the **Pick from Map** functionality.
7. Highlight the entry in the **Control Points** list and click the matching control point location in the image pane. The Edit Control Point dialog box displays showing the control point's location in pixels in the Image X and Image Y fields. Click **OK** to save these entries.

   Note: Remember to type a meaningful description of this location in the **Label** field.
8. Repeat this process until you have identified three or four non-linear points in the preview pane of the Image Registration dialog box.
9. After you have defined all of the control points, click **OK** in the Image Registration dialog box. The raster image displays in the Map window under the vector layer.

   Use the Layer Control feature to position the raster map appropriately with your vector layers.

- For details on converting degree/minutes/seconds coordinates to decimal degrees, see the *Help System*.

Modifying Control Points for Raster Images

If you must adjust the coordinates of a control point because the error is unacceptable, highlight the point in the Image Registration dialog box and choose another location for it in the Map window. To delete control points, click the point and choose the **Delete** button.

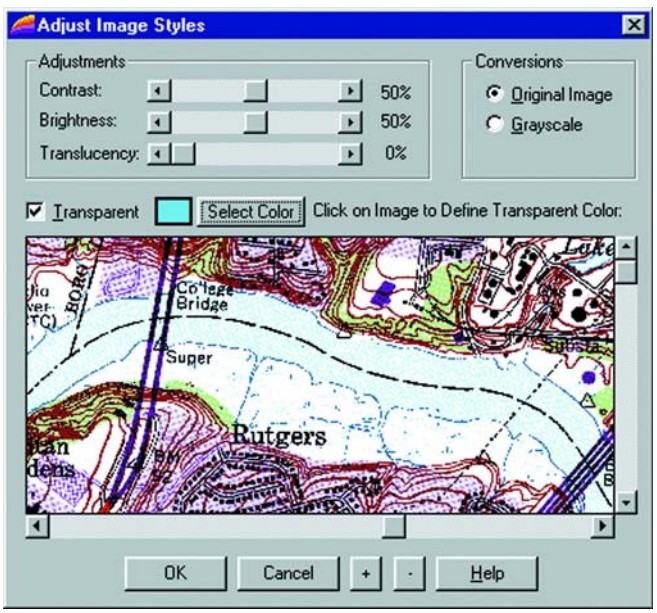
Raster Image Display Options

You can display more than one raster image in a window at a time. This is limited only by your computer's memory. However, if you want to digitize from the raster image, it is best to use only one image in a Map window. This is because two raster images will probably have slightly different rotations.

When using two raster images with different projections, keep in mind that MapInfo Professional will use the projection of the image that is opened first. This means that the second image is only positioned approximately.

Color (Raster Image)

Once you have displayed a raster image file in a Map window, you can make adjustments to the colors in the image. On the **Table** menu, point to **Raster** and click **Adjust Image Styles** to change the settings for that .tab file. On the **Map** menu, point to **Layer Control** and click **Display** and select **Style Override** to adjust the raster style only in this Map window. The Adjust Image Styles dialog box lets you set the contrast and brightness of the image, set translucency, display color raster images in shades of gray, and make one color in the image transparent.



Using the Adjust Image Styles dialog box does not modify the raster image file; instead, it changes the way MapInfo Professional *displays* the raster image file. If you change an image's display style, MapInfo Professional records the new display style in the table file (for example PARCELS.tab) or in the workspace for per layer styles, but MapInfo Professional does not alter the contents of the raster image file (PARCELS.GIF) in any way.

If you change an image's display style and choose **OK**, the new display style is applied immediately. It will also affect all Map windows in which the image is displayed if you select the **Table** menu, and point to **Raster** and click **Adjust Image Styles**. You do not need to choose **Save** to save the changes.

Style Override for Raster Images

MapInfo Professional provides the ability to change the display style for raster and grid images on a per-layer basis through the Layer Control dialog box. The **Style Override** option for raster images works the same way as it does for other map layers. Just choose the **Map** menu, and click **Layer Control**, and select a raster layer in the Layer list. Click the **Display** button. The Display Options dialog box for the image displays. Select the **Style Override** check box and click the **Style** button. The **Adjust Image Styles** dialog box displays. You can change any of the raster image style settings.

Zoom Layering for Raster Images

Zoom layering for raster images controlled from preferences (in the **Options** menu, point to **Preferences** and click **Map Windows** and select **Automatic Raster Zoom Layering**). To change the zoom layering setting for a raster layer that you are currently working with, go to the Display Options dialog box (in the **Map** menu, and point to **Layer Control** and click **Display**) and to either activate or turn off zoom layering. The setting is turned on by default.

Limitations in Using Raster Images

Many of MapInfo Professional's features cannot be applied to raster image tables. As a general rule, you cannot use MapInfo Professional to modify a raster image file. Specific limitations of raster tables include:

- *No Data Saved with Raster Images* A raster table does not have columns, therefore, you cannot attach text or numeric data directly to a raster table, and you cannot perform queries, such as Find, on a raster table. You can, however, overlay a conventional (vector-based) MapInfo Professional table on top of the raster image, and attach data to the conventional table.
- *Map Projections and Reprojections with Raster Images*: When a raster image file displays in a Map window, the file that is opened first determines the projection of the map. If two raster images in a Map window use different map projections, MapInfo Professional will use the projection of the map that is opened first. The Map window will redraw slowly when you overlay other map layers on top of a raster image. The map redraws slowly because MapInfo Professional is re-calculating map coordinates so that the vector map objects conform to the projection of the raster image.

Adjusting the Contrast or Brightness of a Raster Image

The Adjust Image Styles dialog box lets you control how a raster image appears but does not modify the raster image file; instead, it changes the way MapInfo Professional *displays* the raster image file.

Every raster image table consists of two files: a raster image file (e.g. photo.gif), and a table file (e.g. photo.tab). When you change the image display styles, MapInfo Professional stores the new style settings by modifying the table file. MapInfo Professional does not modify the raster image file in any way.

If you change the display options and choose **OK**, MapInfo Professional stores the new display styles immediately; you do not need to choose **File > Save**.

- For instructions, see *Adjusting the Contrast or Brightness of a Raster Image* in the *Help System*.

Adjusting the Translucency of a Raster Image

You can adjust the percentage that layers show through raster images. A translucent image allows you to partially *see through* the image. Translucent images can be layered on top of other layers so that the lower layers are partially visible through the image.

- For specific instructions, see *Adjusting the Translucency of a Raster Image* in the *Help System*.

Printing/Exporting Translucent Raster Images

When printing or exporting a translucent raster image, take advantage of Advanced options.

To print a translucent raster image:

1. Do one of the following:
   - On the **File** menu, click **Print**
   - On the **File** menu, click **Save Window As**
2. Click **Advanced** and choose from the following settings according to your printing and exporting requirements.
   - **Print/Export Border** — Select to include the black rectangle border when exporting.
   - **Internal Handling for Transparent Vector Fills and Symbols** — Select to allow MapInfo Professional to perform special handling when exporting transparent fill patterns or transparent bitmap symbols. If unchecked, the process is handled by Windows.
   - **Use ROP Method to Display Transparent Raster** — Use this option to print the raster image as a metafile (EMF or WMF). Using the ROP method allows any underlying data to be rendered in the original form. Select this check box to allow the internal ROP (Raster Overlay by Pixel) to manage the transparent pixels for the raster.

     Since the ROP Method is largely a display method, not all printers and plotters can use it. We recommend that you experiment with this setting until you get the results you want when printing raster images. This check box is cleared by default.
   - **Print/Export Raster in True Color When Possible** — Select this check box to print your 24-bit raster images in true color. Make sure your printer settings are greater than 256 colors. This check box is selected by default.
3. When you have completed these selections and returned to the **Print** dialog box, click **OK** to begin printing.

14

Working with Coordinate Systems and Projections

Maps at their base are a visual representation in two dimensions of a section of the three-dimensional Earth. Being able to use maps in an electronic format in many ways frees us from the constrictions of the two-dimensional map because we can use mathematical formulas to compensate for the curvature of the Earth. In this chapter, we cover the coordinate systems and projections that are standard in MapInfo Professional and provide the tools with which you can create a custom projections to meet your organization's needs. Whether you are a local government trying to establish new tax rolls or a large company trying to define your sales territory more precisely, creating a custom projection may be a solution you want to explore.

Sections in this Chapter:

- **Working with Coordinate Systems 440**
- **Building Blocks of a Coordinate System 445**
- **Adding Projections to the MAPINFOW.PRJ File 453**
- **Understanding Precision in MapInfo Professional 456**
- **Understanding Affine Transformations 456**
- **Using Earth and Non-Earth Maps 459**
- For more information, see *Using Ocean and Grid Tables* and *Frequently Asked Projection File Questions* in the *Help System*.

Working with Coordinate Systems

The terms “projection” and “coordinate system” are often used interchangeably, however they do not mean the same thing.

Projection - An equation or set of equations that contain mathematical parameters for a map. The exact number and nature of the parameters depends upon the type of projection. You can think of a projection as a method of reducing a map’s distortion caused by the curvature of the Earth, or more precisely, a projection compensates for the shortcomings of depicting maps in two dimensions when the coordinates exist in three dimensions.

Coordinate System - When parameters of a projection are assigned specific values, they become a coordinate system. A coordinate system is a collection of parameters that describe coordinates, one of which is a projection.

Displaying Coordinates

There are two places where coordinates display:

- In the **Status Bar** by cursor location (set in the Map Options dialog box or by clicking on the **Status Bar**).
- In dialog boxes that display area measurements, such as a **Point Object**, **Region Object** etc.

Note: Coordinates can only be entered in the Object Info dialog boxes when a layer is editable.

You can display coordinates in one of the following formats:

- Decimal degrees (e.g., 75.123456 degrees);
- Degrees, minutes, seconds (e.g., 75 degrees 12’ 48”)
- Military Grid Reference (WGS 1984 datum e.g., 41VLG3270555205 for 60 degrees longitude and 60 degrees latitude).

The default is Decimal degrees.

Elements of a Coordinate System

A coordinate system in MapInfo Professional is made up of many elements which need to be specified in advance. Once these elements are in place, you can be sure that your maps are as accurate as possible. These are the projection elements you need to set in the MAPINFOW.PRJ file:

- **Projection Types**
- **Datums**
- **Units**
- **Coordinate System Origin**
- **Standard Parallels (Conic Projections)**
- **Oblique Azimuth (Hotine Oblique Mercator)**
- **Scale Factor (Transverse Mercator)**

- False Easting and False Northing
- Range (Azimuthal Projections)

Note: For datum and unit tables, see Projection Datums on page 527 and Units on page 535.

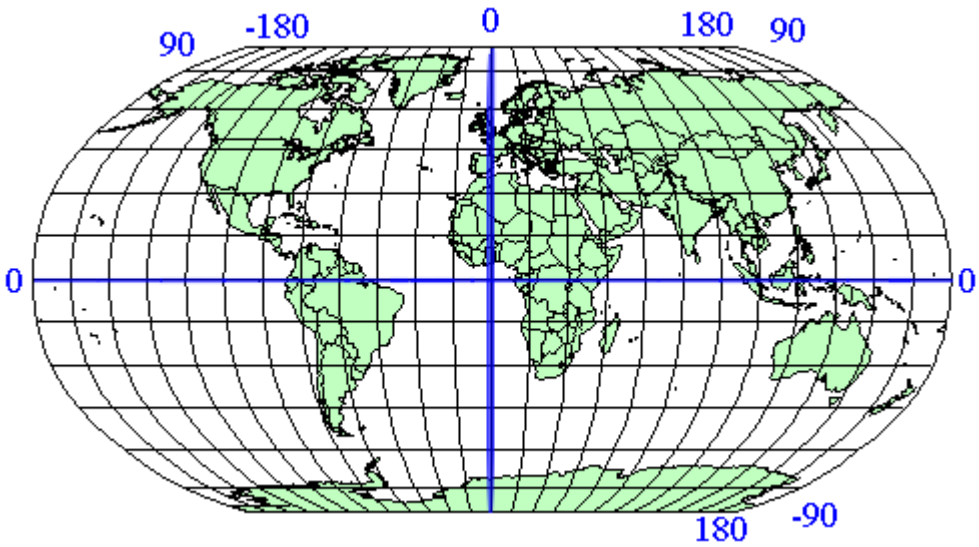
Understanding Coordinate Systems

You can make a map out of any globe without distorting the points on the surface by placing the globe into an imaginary cylinder.

Figure: Globe with Longitude/Latitude Projection

If you transfer the touch points from the globe surface onto the cylinder and roll out the cylinder onto graph paper, the result is a map as in the figure below. In the map that would be created from this cylinder, the Equator is 0 degrees all the way around the globe and the points on that line are completely accurate.

Figure: Longitude/Latitude Projection Map



When you add longitude and latitude lines at 15 degree increments to each side of the Equator and the Prime Meridian you create a reference grid. The lines furthest from the Prime Meridian are +180 degrees toward the right and -180 degrees to the left. This map projection is commonly called the Longitude/Latitude projection.

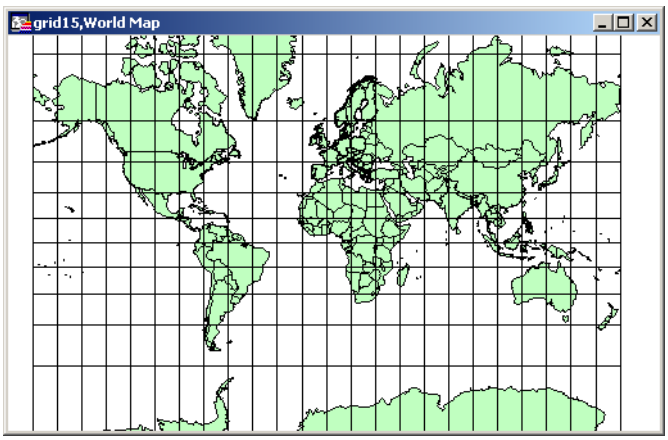
This is often considered the default projection. It is the most effective map for areas nearest the Equator but measurements further away tend to increase in distortion.

Because many people do not live near the Equator, other projections came into use to create more accurate local maps. Accuracy depends upon how you project the globe onto the cylinder. If you turn the cylinder so that it touches the Prime Meridian instead (or any line of longitude, 90 degrees away from the Equator) you have a Transverse Projection. The closer you are to the place the cylinder touches the globe, the more accurate the measurements are.

Figure: Globe Demonstrating the Transverse Projection

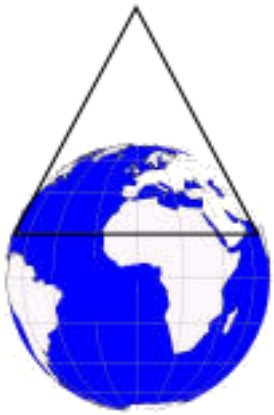
Transverse projections allow us to make maps that are more North-South line accurate, as long as you compensate for the distance from the new “Equator” which in this case is the Prime Meridian.

Figure: Transverse Mercator Projection Map



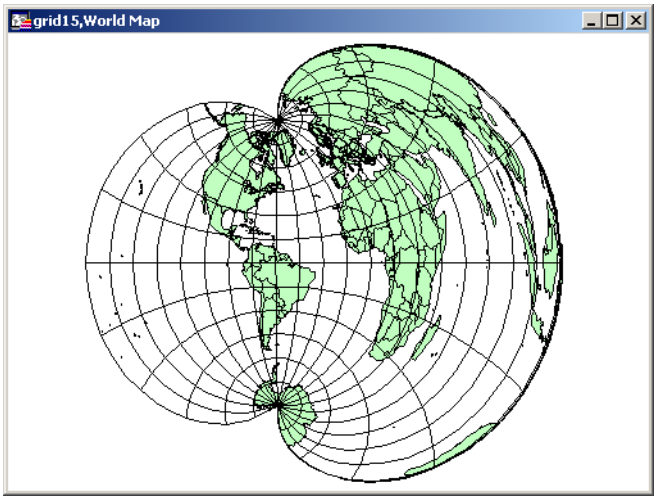
A third type of projection attempts to resolve the distortion problem in another way. Conic projections use a cone shape instead of a cylinder to create the “touch points” .

Figure: Globe with Conic Projection



This type of projection is much more accurate for large regions or countries that wider in the East-West direction than in the North-South direction. There is much less distortion regionally because the touch points of a cone are closer to the map surface than those of a cylinder.

Figure: Brazilian Polyconic Projection Map



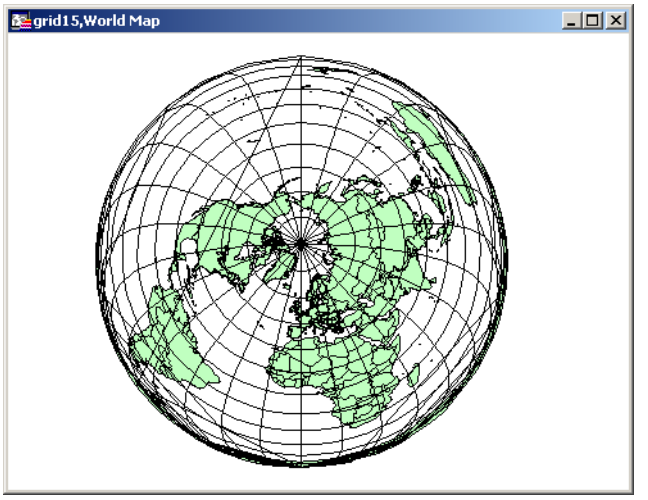
As you can see from the previous figure, the conic maps are best for small regional areas. The larger-scale map has too much distortion to be useful.

A fourth type of projection, the Azimuthal projection, does not use cones or cylinders but a simple circle that goes all the way around the globe over a particular point. This projection provides a “view from space” over a particular point.

Figure: Globe with Azimuthal Projection

This type of projection is most useful when you need to work with a particular hemisphere. A hemisphere need not be North-South or East-West based. The next figure uses the North Pole as the center point for the Azimuthal Projection.

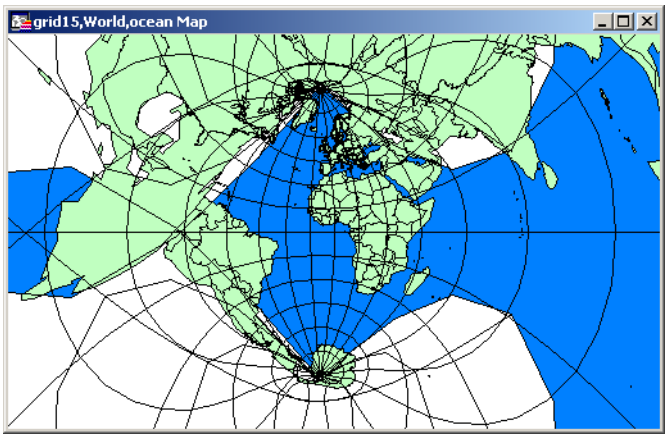
Figure: Lambert Azimuthal Projection Map



You can use more than one projection that rotates a cylinder slightly along the Equator. This style is used in the Universal Transverse Mercator (UTM) projection. UTM maps the Earth with a transverse cylinder projection to create standard "UTM Zones". By rotating the cylinder around the globe in six

degree increments, the UTM assures that all spots on the Earth are within 3 degrees of the center line. (The Gauss-Kruger system is a European system akin to UTM that also uses a transverse cylinder rotated in six degree steps).

Figure: Universal Transverse Mercator Projection Map (UTM Zone 29)



Almost all projections you will use are one of these types. They are either cylindrical (regular or transverse), conic, or azimuthal projections and are customized by slightly different projection parameters. Projection parameters are options that describe how the projection is arranged.

You can further customize projections by specifying different parameters for the projection you want to use. For example, you can specify the longitude and latitude of any point on the Earth to create your own Azimuthal projection of that point. You can customize conic projections by specifying the parallel of latitude at which the cone should be tangent.

Building Blocks of a Coordinate System

In this section, we provide the tables required to create your own coordinate systems using map projections, datums, units, Origins, Standard Parallels, Azimuths, Scale Factors, False Eastings, False Northings, and Ranges. You might want to create your own coordinate system if accuracy is crucial to understanding your data or if your data is specified in relation to a non-standard point, and you would prefer to keep your data in that custom coordinate system.

Coordinate Systems, Projections, and their Parameters

By specifying a projection type and various required parameters, you create a mathematical algorithm for producing equivalent coordinates in degrees for the projected coordinate system. Each projection has specific parameters you can customize to make your maps more geographically accurate. The following table details each major coordinate system type and the parameters you can use to customize that system. The parameters are listed in the order they appear in the relevant projection entries in the MAPINFOW.PRJ file. To create your own coordinate system using a particular projection, you must add an entry into the MAPINFOW.PRJ file.

The parameters of a coordinate system are (in this order):

- Coordinate System Name
- Projection Type
- Datum
- Units
- Original Longitude
- Original Latitude
- Standard Parallel 1
- Standard Parallel 2
- Azimuth
- Scale Factor
- False Easting
- False Northing
- Range

Note: Each of these headings is described in detail in the next few pages.

For a complete list of common coordinate systems and their necessary parameters, see **Projections and Their Parameters in Chapter C on page 524**

Projection Types

The following list names the projection types used in the MAPINFOW.PRJ file. These projection types indicate the type of map you are using as the basis for your projection.

Number	Projection
9	Albers Equal-Area Conic
28	Azimuthal Equidistant (all origin latitudes)
5	Azimuthal Equidistant (polar aspect only)
30	Cassini-Soldner
2	Cylindrical Equal-Area
14	Eckert IV
15	Eckert VI
6	Equidistant Conic, also known as Simple Conic
17	Gall
7	Hotine Oblique Mercator
4	Lambert Azimuthal Equal-Area (polar aspect only)
29	Lambert Azimuthal Equal-Area

Number	Projection
3	Lambert Conformal Conic
19	Lambert Conformal Conic (modified for Belgium 1972)
1	Longitude/Latitude
10	Mercator
11	Miller Cylindrical
13	Mollweide
18	New Zealand Map Grid
31	Prince Edward Island Double Stereographic
27	Polyconic
26	Regional Mercator
12	Robinson
16	Sinusoidal
20	Stereographic
25	Swiss Oblique Mercator
8	Transverse Mercator (also known as Gauss-Kruger)
21	Transverse Mercator (modified for Danish System 34 Jylland-Fyn)
22	Transverse Mercator (modified for Danish System 34 Sjaelland)
23	Transverse Mercator (modified for Danish System 34/45 Bornholm)
24	Transverse Mercator (modified for Finnish KKJ)

Specifying the Bounds for Coordinate Systems

You can specify the bounds for coordinate systems in the MAPINFO PROFESSIONALW.PRJ file. To do so, add 2000 to the projection number and list the bounds after the projection parameters. The general form is:

```
name, projectionnum + 2000, projection parameters, x1, y1, x2, y2
```

For example, to define a UTM Zone 10 coordinate system with bounds of (100000, 400000) to (200000, 450000), use this line:

```
 "UTM Zone 10", 2008, 74, 7, -123, 0, 0.9996, 500000, 0, 100000, 400000,
200000, 450000
```

To define a Longitude / Latitude coordinate system with bounds of (-50, 30) to (-48, 35), use this line:

```
"Longitude / Latitude", 2000, 0, -50, 30, -48, 35
```

You can also define a coordinate system with bounds and an affine transformation. In that case, add 3000 to the projection number, and list the bounds after the affine transformation constants. The general form is:

```
name, projectionnum + 3000, projection parameters, unitnum, A, B, C, D, E,
F, x1, y1, x2, y2
```

Accounting for Affine Transformations and Explicit Bounds in Projection Types

You can modify projection type entries in the MAPINFOW.PRJ to add a constant value to account for affine transformations and explicit bounds. Valid constant values are listed in the next table:

Constant	Coordinate System has:	Parameters
1000	Affine transformations	Affine units specifier and coefficients appear after the regular parameters for the system.
2000	Explicit bounds	Bounds appear after the regular parameters for the system.
3000	Both affine transformations and bounds	Affine parameters follow system's parameters; bounds follow affine parameters.

Example:

In this example we use the Transverse Mercator coordinate system with the NAD 1983 datum. You might have this line in your MAPINFOW.PRJ file:

```
"UTM Zone 1 (NAD 83)", 8, 74, 7, -177, 0, 0.9996, 500000, 0
```

If you want to account for an affine transformation for this system, you would add the constant to the projection type and append the parameters of the affine transformation as listed below:

Units=meters; A=0.5; B=-0.866; C=0; D=0.866; E=0.5; and F=0

Therefore, the new entry to append the parameters of the affine transformation would be:

```
"UTM Zone 1 (NAD 83) - rotated 60 degrees", 1008, 74, 7, -177, 0,
0.9996, 500000, 0, 7, 0.5, -0.866, 0, 0.866, 0.5, 0
```

where:

Entry	Description
1008	Achieved by adding the constant (1000) to the projection type (8)
7	Units for the affine transformation (7 = meters)
0.5, -0.866, 0, 0.866, 0.5, 0	Affine parameters.)

To supply explicit bounds to the coordinate system (x1, y1, x2, y2)=(-500000, 0, 500000, 1000000), the required line entries would be:

```
"UTM Zone 1 (NAD 83) - bounded", 2008, 74, 7, -177, 0, 0.9996, 500000,
0, -500000, 0, 500000, 1000000
```

where:

Entry	Description
2008	Produced by adding the constant (2000) to the projection type (8)
-500000, 0, 500000, 1000000	Explicit bounds parameters

To customize the coordinate system using both the affine transformation and explicit bounds, the entry in the MAPINFOW.PRJ would be:

```
"UTM Zone 1 (NAD 83) - rotated and bounded", 3008, 74, 7, -177, 0,
0.9996, 500000, 0, 7, 0.5, -0.866, 0, 0.866, 0.5, 0, -500000, 0, 500000, 1000000
```

where:

Entry	Description
3008	Produced by adding the constant (3000) to the projection type (8)
7	Units for the affine transformation (7 = meters)
0.5, -0.866, 0, 0.866, 0.5, 0	Affine parameters
-500000, 0, 500000, 1000000	Explicit bounds parameters (See **Accounting for Affine Transformations and Explicit Bounds in Projection Types on page 448**.)

Datums

A datum is established by tying a reference ellipsoid to a particular point on the earth. The following Datums table lists the details for each datum:

- The number used to identify the datum in the MAPINFOW.PRJ file.
- The datum's name
- The maps for which the datum is typically used
- The datum's reference ellipsoid

For a comprehensive list of supported projection datums, see **Projection Datums in Appendix C on page 527**. For a list of datum changes by version, see **Coordinate System Enhancements by Version on page 538**.

Note: To create a custom datum, see *Defining Custom Datums* in the *Help System*.

Converting Coordinates from One Datum to Another

When converting coordinates from one datum to another, MapInfo Professional has used the Molodensky (3-parameter) and Bursa-Wolfe (7-parameter) methods. These are general-purpose methods that can convert coordinates from any datum to any other datum.

After the NAD 83 datum was introduced, NOAA developed a program called NADCON, which stands for North American Datum CONversion. This is a very specialized program that converts coordinates only from NAD 27 to NAD 83 and vice versa. For this specialized task, it's much more accurate than the Molodensky general-purpose method; NADCON is accurate to about 0.1 meter, and Molodensky is accurate to only 10-30 meters. Most U.S. government agencies, including the Census Bureau, have standardized on NADCON for converting between NAD 27 and NAD 83.

The NADCON algorithm is used to convert coordinates between NAD 27 and NAD 83 if those coordinates lie within the areas covered by NADCON (United States, Puerto Rico, and the Virgin Islands).If the coordinates lie outside those areas, or if they use datums other than NAD 27 or NAD 83, MapInfo Professional uses the Molodensky or Bursa-Wolfe conversion methods.

Due to the file access required, the NADCON conversion method can be slightly slower than the Molodensky method. If you want to turn off the NADCON conversion, add a “NADCON” entry to the registry. The registry entry should have this path:

```
HKEY_LOCAL_MACHINE\Software\MapInfo\MapInfo\Common\NADCON
```

If this entry is set to zero, then the Molodensky conversion method will be used instead of NADCON.

```
NADCON=0
```

Units

The units indicate the measurement that the projection uses to keep track of space. To find a complete list of units and their corresponding projection entries, see **Units in Appendix C on page 535**.

Coordinate System Origin

The coordinate system origin is the point on the Earth (specified as longitude and latitude degrees) from which all coordinate distances are to be measured. X = 0 and Y = 0 at the origin point, unless a false easting and/or false northing is used (see below). It is chosen to optimize the accuracy of a particular coordinate system. As we move north from the origin, Y increases; X increases as we move east. These coordinate values are generally called northings and eastings.

For the Transverse Mercator projection, the origin’s longitude defines the central meridian. In constructing the Transverse Mercator projection a cylinder is positioned tangent to the earth. The central meridian is the line of tangency. The scale of the projected map is true along the central meridian.

In creating a Hotine Oblique Mercator projection it is necessary to specify a great circle that is not the equator nor a meridian. MapInfo Professional does this by specifying one point on the ellipsoid and an azimuth from that point. That point is the origin of the coordinate system.

Standard Parallels (Conic Projections)

In conic projections a cone is passed through the earth intersecting it along two parallels of latitude. These are the standard parallels. One is to the north and one is to the south of the projection zone. To use a single standard parallel specify that latitude twice. Both are expressed in degrees of latitude.

Oblique Azimuth (Hotine Oblique Mercator)

When specifying a great circle (such as the Hotine Oblique Mercator) using a point and an azimuth (arc), the azimuth is called the Oblique Azimuth and is expressed in degrees.

Scale Factor (Transverse Mercator)

A scale factor is applied to cylindrical coordinates to average scale error over the central area of the map while reducing the error along the east and west boundaries. The scale factor has the effect of recessing the cylinder into the earth so that it has two lines of intersection. Scale is true along these lines of intersection.

You may see the scale factor expressed as a ratio, such as 1:25000. In this case it is generally called the scale reduction. The relationship between scale factor and scale reduction is:

scale factor = 1-scale reduction

In this case the scale factor would be 1-(1/25000) or 0.99996.

False Easting and False Northing

As you can see in the **Longitude/Latitude Projection Map on page 441**, X and Y coordinate parameters are commonly designated in relationship to a single point. Points to the left of that center point are negative and points to the right are positive. Points above that center point are positive and points below that point are negative.

In the days of the tall ships, these calculations and computations were done by hand. Using positive and negative signs made these calculations more complicated. The terms “false easting” and “false northing” were used to remove these signs and refer to the absolute value of the X and Y coordinates. MapInfo Professional handles these computations, but these parameters still have to be accounted for in the projections that use them.

Range (Azimuthal Projections)

The range specifies, in degrees, how much of the Earth is visible. The range can be between 1 and 180. When you specify 90, you see a hemisphere. When you specify 180 you see the whole earth, though much of it is very distorted.

About Polyconic Coordinate Systems

The following description has been copied from “Map Projections – A Working Manual”, USGS Professional Paper 1395, by John P. Snyder.

> The Polyconic projection, usually called the American Polyconic in Europe, achieved its name because the curvature of the circular arc for each parallel on the map is the same as it would be following the unrolling of a cone which had been wrapped around the globe tangent to the particular parallel of latitude, with the parallel traced onto the cone. Thus, there are many (”poly-”) cones involved, rather than the single cone of each regular conic projection.
>
> The Polyconic projection is neither equal-area nor conformal. Along the central meridian, however, it is both distortion free and true to scale. Each parallel is true to scale, but the meridians are lengthened by various amounts to cross each parallel at the correct position along the parallel, so that no parallel is standard in the sense of having conformality (or correct angles), except at the central meridian. Near the central meridian, distortion is extremely small.
>
> This projection is not intended for mapping large areas. The conversion algorithms used break down when mapping wide longitude ranges. For example, World.tab, from the sample data shipped with MapInfo Professional, may exhibit anomalies if reprojected using Polyconic.

Examples of Projection Entries in the MAPINFOW.PRJ File

The MAPINFOW.PRJ file lists the parameters for each coordinate system on a separate line, as in the following examples:

“Mollweide (Equal Area)”, 13, 62, 7, 0

“Albers Equal–Area Conic (Alaska)”, 9, 63, 7, –154, 50, 55, 65, 0, 0

“UTM Zone 9 (NAD 27 for Canada)”, 8, 66, 7, –129, 0, 0.9996, 500000, 0

This is a basic list of the elements of a coordinate system, for review. There are some projections that do not require all of the elements in the list. Following this list, you can see some entries from the .PRJ file.

1. The first element in each list is the name of the projection in quotes.
2. The second element in each list is the number that identifies the projection number as indicated in **Projection Types on page 446**.
3. The third element in each list is the datum ID that identifies the appropriate datum for the projection. See **Datums on page 449** for a complete list of supported datums.
4. The fourth element in each list is the units, which indicate the units of the projection. See **Units on page 535** for a current list of the supported units.
5. The next element in some lists is the coordinate system origin. See **Coordinate System Origin on page 450** for a complete description of this entry.
6. The remaining elements are specific to particular types of projections. You can see their descriptions in **Standard Parallels (Conic Projections) on page 451**, **Oblique Azimuth (Hotine Oblique Mercator) on page 451**, **Scale Factor (Transverse Mercator) on page 451**,

False Easting and False Northing on page 451 and Range (Azimuthal Projections) on page 451.

Note: Each element in a projection entry is separated by a comma.

Let's look at some specific coordinate systems to prepare you to create your own projection. It is important to remember that the elements of a projection are different for each projection. Here are some examples we have already seen:

Note: There are additional examples in the *Help System*.

Example: "Mollweide (Equal Area)", 13, 62, 7, 0

where:

Where	Refers to:	For More Information, See:
"Mollweide (Equal Area)",	Name of Coordinate System	Projections and Their Parameters on page 524
13,	Projection type used	Projection Types on page 525
62,	Datum used	Datums on page 449
7,	Units used	Units on page 535
0	Origin Longitude used	Coordinate System Origin on page 450

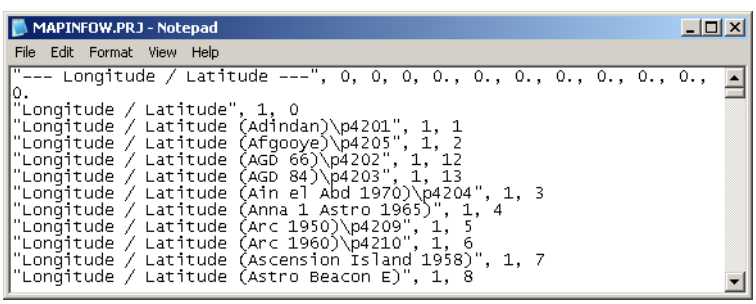
Adding Projections to the MAPINFOW.PRJ File

Once you understand the structure of the entries in the MAPINFOW.PRJ file, you are ready to create a new projection entry for your coordinate system. You may want to make a copy of the MAPINFOW.PRJ file in case you want to revert back to it later.

To create a new projection entry for the coordinate system in the MAPINFOW.PRJ file:

1. Open MAPINFOW.PRJ in a text editor or word processor. In this file, you are going to add the new projection entries.

Figure: MAPINFOW.PRJ in Notepad

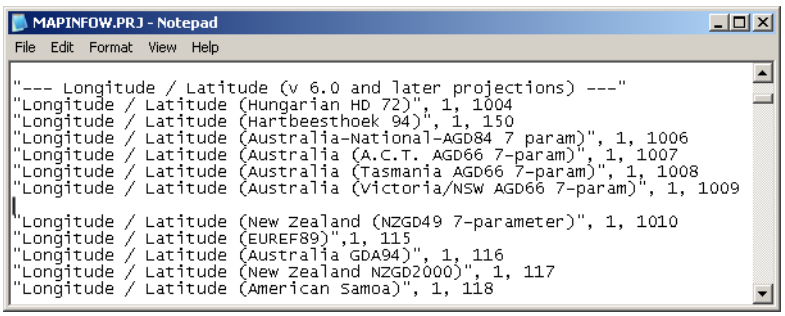

MAPINFOW.PRJ - Notepad
File Edit Format View Help
"--- Longitude / Latitude ---", 0, 0, 0, 0., 0., 0., 0., 0., 0., 0.,
"Longitude / Latitude", 1, 0
"Longitude / Latitude (Adindan)\p4201", 1, 1
"Longitude / Latitude (Afgooye)\p4205", 1, 2
"Longitude / Latitude (AGD 66)\p4202", 1, 12
"Longitude / Latitude (AGD 84)\p4203", 1, 13
"Longitude / Latitude (Ain el Abd 1970)\p4204", 1, 3
"Longitude / Latitude (Anna 1 Astro 1965)", 1, 4
"Longitude / Latitude (Arc 1950)\p4209", 1, 5
"Longitude / Latitude (Arc 1960)\p4210", 1, 6
"Longitude / Latitude (Ascension Island 1958)", 1, 7
"Longitude / Latitude (Astro Beacon E)", 1, 8

2. Scroll down in this list to find the type of projection you want to base your map on. See Understanding Coordinate Systems on page 441 for descriptions of the different projection types.

3. Add a new line at the end of the projection list you are modifying.

   For example, to add a new Universal Transverse Mercator projection (Australian Map Grid using AGD66 datum), scroll down to that entry and type the new projection at the end of the list.

   Figure: Adding a Line in the MAPINFOW.PRJ File


MAPINFOW.PRJ - Notepad
File Edit Format View Help
"--- Longitude / Latitude (v 6.0 and later projections) ---"
"Longitude / Latitude (Hungarian HD 72)", 1, 1004
"Longitude / Latitude (Hartbeesthoek 94)", 1, 150
"Longitude / Latitude (Australia-National-AGD84 7 param)", 1, 1006
"Longitude / Latitude (Australia (A.C.T. AGD66 7-param)", 1, 1007
"Longitude / Latitude (Australia (Tasmania AGD66 7-param)", 1, 1008
"Longitude / Latitude (Australia (Victoria/NSW AGD66 7-param)", 1, 1009
"Longitude / Latitude (New Zealand (NZGD49 7-parameter)", 1, 1010
"Longitude / Latitude (EUREF89)",1, 115
"Longitude / Latitude (Australia GDA94)", 1, 116
"Longitude / Latitude (New Zealand NZGD2000)", 1, 117
"Longitude / Latitude (American Samoa)", 1, 118

4. On a new line, type the new parameter entries based on the required parameters described for that projection type in the table Projections and Their Parameters on page 524.

   - If the name of your projection does not appear in the Common Map Projections list, consider the kind of projection you are creating (Latitude/Longitude, Conic, Transverse, etc.) and follow the table entries for the type of projection you want.
   - Remember to include constant values (Accounting for Affine Transformations and Explicit Bounds in Projection Types on page 448) to indicate an affine transformation, specific bounds, or both if appropriate or necessary.

   Note: The order of parameters is vitally important. Remember to separate each parameter with a comma.

5. Save your edited MAPINFOW.PRJ file in the directory in your user directory.

Note: In the past the MAPINFOW.PRJ file was saved in your installation directory but this did not allow different users to have different PRJ files. This new file placement permits this.

Things to keep in mind when editing the MAPINFOW.PRJ file:

- You must record the X and Y coordinates of the origin point in decimal degrees.
- Remember to include a negative sign for west longitudes and south latitudes.
- You must list the origin longitude first in the MAPINFOW.PRJ file entry.
- Carry out decimals to at least five (5) places for greater accuracy.
- Do not use commas to represent thousands or millions in large numbers. Only use commas to separate parameters from one another.
- When specifying projection, datum and units, use the *number* that represents the parameter. These numbers are listed in the table for each parameter earlier in this appendix. In our example, 6 represents Equidistant Conic projection; 74 represents NAD 83 datum, and 7 represents meters.

Using the New Projection in a Coordinate System

Once you have created this new projection, you can use it in a Map window to replace the coordinate system you are using.

1. Open the map for which you want to change projections.
2. From the **Map** menu, select **Options** to display the Map Options dialog box.
3. Click the **Projections** button to display the Choose Projection dialog box.

Note: To change the projection of a tab file and all of the map objects in it, use the **File > Save Copy As** command and select the new projection.

4. Select the new projection from the list and click **OK** to confirm. The Map Options dialog redisplays.
5. Click **OK** to implement the new projection in the Map window.

Entering a New Coordinate System (Example)

To illustrate this process in another way, create the following coordinate system using these parameters by adding a new entry to the MAPINFOW.PRJ file:

Parameter Type	Entry	Description
Name	“Equidistant Conic Plus”	Name of the new coordinate system
Projection Type	6,	Equidistant Conic
Datum	74,	(NAD 83)
Units	7,	meters
Origin Longitude	-90.5,	90°30′W
Origin Latitude	30,	30°N,
Standard Parallel 1	10.33333,	10°20′N
Standard Parallel 2	50,	50°N
False Easting	10000000,	10,000,000 m
False Northing	500000	500,000 m

1. Open MAPINFOW.PRJ in a text editor or word processor.
2. Go to the Equidistant Conic section and add a new line.
3. Type the name of your new coordinate system in quotes, followed by a comma.
4. Enter the following information to represent your coordinate system:

```
6, 74, 7, -90.5, 30, 10.33333, 50, 10000000, 500000
```

5. Save your edited MAPINFOW.PRJ file.

You can use your custom coordinate system just as you would use any of the coordinate systems that come with MapInfo.

There are other ways you can edit this file. To shorten the list, remove coordinate systems from the file. You can also change the names, change group headings and reorder the file to suit your needs.

Note: Group headings are distinguished by the hyphen at the beginning of the name. Names of coordinate systems cannot begin with a hyphen or a space.

Understanding Precision in MapInfo Professional

MapInfo Professional is a very good tool for working at a high precision level. But the onus is on the user to discover the practical limits of the program in various circumstances and how to set the work environment in order to obtain the desired precision level. Millimeter level precision can be easily attained and maintained with projected maps in the metric system.

What is Precision?

The most basic component of any GIS is the spatial data that defines the map features. This spatial data could not exist without the coordinate systems that are used to specify the location information. Coordinate precision is a measure of storing spatial data as accurately as possible. Of course, this can be no more precise than the original data provided. Precision is a measurement of how accurately you can store and retrieve the spatial data and has nothing to do with the quality of the data. The number of reliable digits in your coordinate is termed significant digits. Precision is measured in terms of these significant digits.

- For topics related to precision and map bounds, see *Understanding Precision in MapInfo Professional* in the *Help System*.

where

Understanding Affine Transformations

An affine transformation allows you to match the points on two vector maps that use different coordinate systems so they can be used together. The base map stays the same while the derived map is transformed mathematically to match up coordinates to the base map.

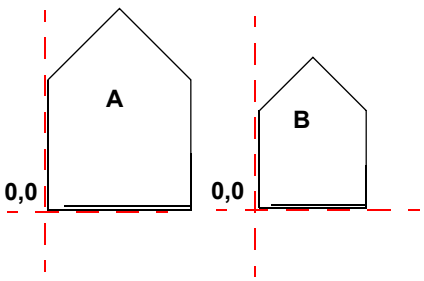
MapInfo Professional provides the definitions for scale, translation, rotation, reflection, and shearing necessary to support an optional affine transformation for any coordinate system definition.You can also define a coordinate system with bounds and/or with an affine transformation. This is described in detail in **Accounting for Affine Transformations and Explicit Bounds in Projection Types on page 448**.

Description of an Affine Transformation

There are several basic types of transformation that can be applied to the base map using an affine transformation. These include scaling, translation, rotation, shearing, and reflection.

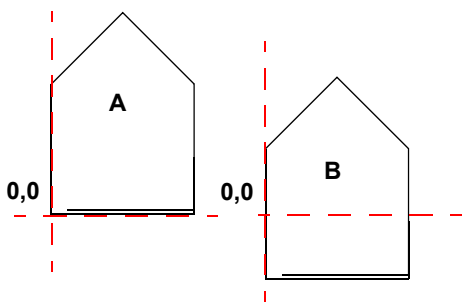
- For more information, see *Understanding Affine Transformations* in the *Help System*.

The *scale* factor of a transformation indicates the distance between the fixed points of one map versus the fixed points of the second map. If the only difference between two maps is the scale, the affine transformation of the derived map is only the same map zoomed in or out around a fixed point. The orientations of the lines connecting the points, and the angles between these lines, remain the same. The scaling in the case of the figure below is around the 0,0 point.



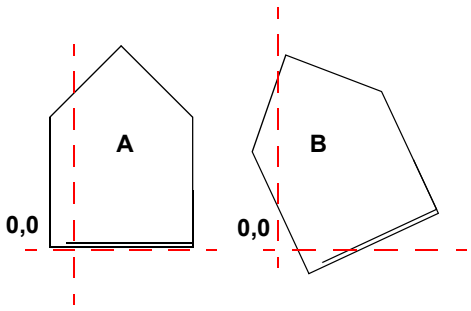
The difference between these images is the scale. To create an affine transformation that maps the base image (A) to the derived image (B), change only the scale.

The *translation* factor of a transformation is when every point on an image follows a parallel path and no rotation takes place.



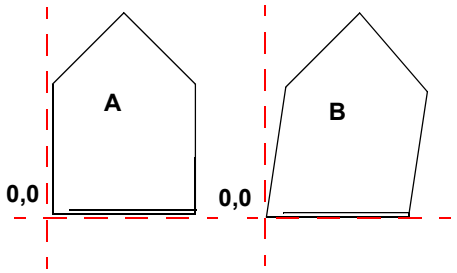
The difference between these two images is the translation.

The *rotation* factor of a transformation indicates that the image turns on a particular point. The next figure shows a 25-degree rotation of the map around the 0,0 point.



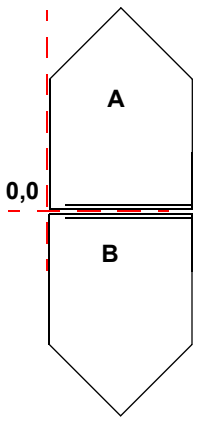
The difference between these two images is not the scale, because the size of each image is the same. The difference is the rotation of the derived image (B).

The *shearing* factor of a transformation indicates that one of the coordinates of one image should change proportionally to the other. You can apply a shear transformation either on the x-axis as shown in the next figure or on the y-axis. As you can see the vertical scale of the image has not changed, and the corner of the figure at 0,0 has not moved -- but points higher up on the figure are shifted progressively further to the right.



The difference is the shearing of the derived image (B).

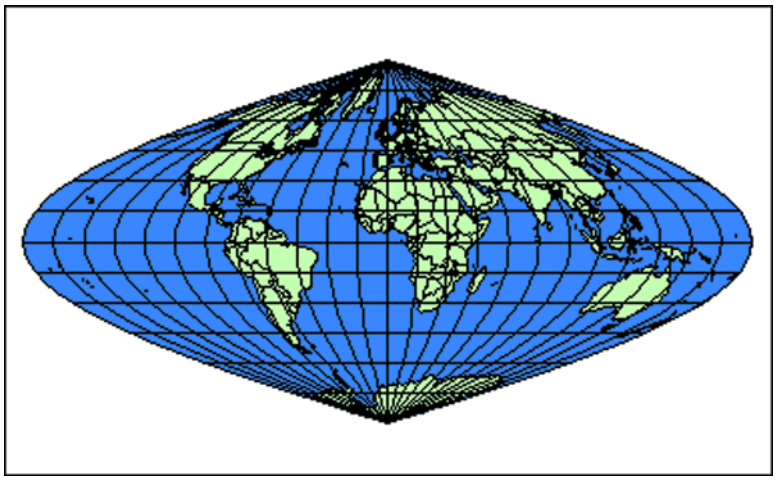
The *reflection* factor of a transformation indicates that the derived image is the mirror image of the base image, that is, all the points in the base image should be reflected across some straight line, such as the x-axis or y-axis. In the figure below, the derived image (B) is the reflection of the base image (A).



The difference between these two images is that the derived image (B) is a reflection of the base image (A) along the x-axis.

Using Earth and Non-Earth Maps

Earth maps and non-earth maps generally require different treatment. The following section on projections apply only to earth maps. An *earth map* contains objects that have a particular location on the earth's surface. All maps that MapInfo Professional sells are earth maps. Coordinates typically represent an object's location in longitude and latitude, although other coordinate systems (using various projections) may be used instead.



Sinusoidal (Equal-Area)

Use earth maps to:

- Overlay your map onto any maps that MapInfo Professional supplies.
- Use or change projections.
- Specify objects on the map in terms of longitude and latitude.

A *non-earth map* contains objects that have no specific location on the earth's surface. Floor plans are typical examples of non-earth maps. A non-earth map has a coordinate system, but since its map points are not referenced to locations on earth, the coordinate system does not contain a projection. Even though the floor plan describes a building that may be located somewhere on the Earth, the coordinates of objects in the floor plan are generally not referenced to positions on the Earth. Rather, the object's coordinates are referenced to the floor plan itself, generally representing distance from the lower left corner of the floor plan. The next figure depicts a floor plan and is an example of a non-earth map.

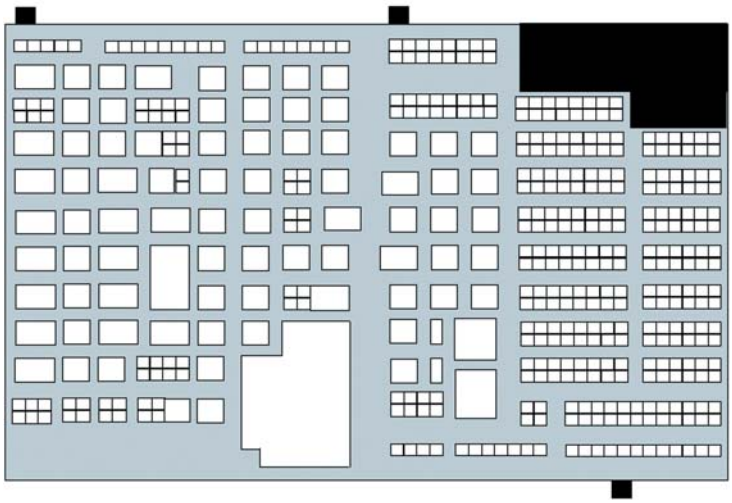
Specifying Coordinates for a Non-Earth Map

To specify coordinates for a non-earth map:

1. Ensure that your non-earth map is open and that it is the active window.
2. Choose **Map > Options**. The Map Options dialog box displays.
3. Click the **Projection** button. The Choose Projection dialog box displays.

4. Choose **Non-Earth** from the **Category** drop-down list, and choose a unit from the **Category Members** drop-down list to specify the bounds and units for your non-earth coordinate system.
5. Click **OK**. The Non-Earth Coordinate Bounds dialog box displays.

The Non-Earth Coordinate Bounds dialog box allows you to specify the bounds and units for your non-earth coordinate system. You can use positive or negative numbers to specify the minimum and maximum X and Y values.



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Working with Web Services

A web service is a software system that is accessible using an intranet or Internet connection. MapInfo Professional® supports the Web Map Service and Web Feature Service, which allow you to retrieve data that others are sharing internally or world-wide. The power of web services is that you can use them to create more powerful maps or in the case of geocoding services get more accurate and precise results using the same data.

Subsequently we added Geocoding and Driving Region web services. A Geocoding web service allows you to geocode with greater accuracy because the maps on a service are more precise. A Driving Region web service allows you to create time- and distance-based buffers around a site for determining proximity to a particular location. You might use this service to find the customers closest to a store, or to determine which insured customers are closest to a weather pattern.

Sections in this Chapter:

- Introduction to Web Services 462
- Enhancing Map Data using a Web Map Service 463
- Enhancing Map Data using a Web Feature Service 466
- Geocoding using a Geocoding Server 469
- Creating Routing Distance and Time Buffers 473
- Accessing Envinsa Online Services at MapInfo 476

Introduction to Web Services

MapInfo Professional web services can add detail and precision to the maps you are creating and analyzing. Currently, you can use four web services from within MapInfo Professional:

- Web Map Service
- Web Feature Service
- Geocoding Service
- Routing or Driving Region Service

Accessing Web Services in MapInfo Professional

To make it easier to access these web services, there is a Web Services toolbar. These toolbar buttons display frequently used web services dialog boxes.

To display the toolbar:

1. From the **Options** menu, select **Toolbars** to display the Toolbar Options dialog box.
2. Select the **Web Services** check box in the **Show** column. Click **OK**.

Figure: Web Services Toolbar

1 *Open WMS Table button* ***2*** *Open WFS Table button* ***3*** *Find Address button*
4 *Geocode Using Server button* ***5*** *Create Driving Regions button*
6 *Web Services Preferences button*

For more information about these buttons, see the Accessing Web Services in MapInfo Professional topic in the Help System.

Server-Side Authentication for WMS and WFS

You can access WFS and WMS servers that require basic authentication using the built-in standard mechanism for internet servers. To connect to a WFS or WMS server that requires authentication, complete the Connect dialog box that displays.

Enter the appropriate user name and password and select the **Remember my password** check box to have the site "remember" your password for you. Click **OK** to enter the site. If you do not have a valid user name and password, you cannot connect to the site.

Accessing Secure Web Sites

SSL is an international standard security protocol for exchanging sensitive information between a web site and your computer. You know SSL-enabled sites by the https: address. When you connect to an SSL-enabled WFS or WMS server, your computer and the server exchange digital certificates, which minimize the threat of theft of sensitive data. If you try to connect to a WFS or WMS server and you have a valid SSL certificate, you should be able to connect to the web site.

Enhancing Map Data using a Web Map Service

Web Services can provide more data for you to work with in MapInfo Professional. A Web Map Service (WMS) allows you to access maps and data through your local intranet or the Internet. This innovation is based on a specification from the Open GIS Consortium (OGC) that allows you to use raster map images from servers that also comply with the specification. You must specify the coordinate system within your data request to ensure that the images you retrieve "sync up" or register with your other map data.

How Does MapInfo Professional Use WMS Servers?

When you create a .tab file from WMS layer(s), you are actually creating a pointer to an XML file that keeps track of the data you selected, (the server address, the selected layer(s), the styles, the format, and the projection settings). You never actually retrieve the data and save it on your computer. Every time you add a WMS table as a layer to your map or you change the view of the map, the system generates a map request and retrieves the layer information. To do this, the .tab file points to an XML file which retrieves the information from the WMS Server and displays it on your computer. If you are not connected to the Internet, the server is unavailable, or the WMS layer(s) you are retrieving are not available, you cannot use the WMS .tab file.

Note: The WMS sites that MapInfo includes in this documentation or in the standard installation of MapInfo Professional have been verified as part of the testing process. We cannot guarantee that these sites will remain active, only that they were active as of this writing.

WMS Maps Display in Current Map Window's Coordinate System by Default

Many times, when you are retrieving a WMS map, you are adding it to enhance the detail of a Map window that you are already working on. We have changed the default behavior of the Projection drop-down box. Now, this list defaults to the projection that matches the front-most map window, if that projection is available in the list.

But What if a WMS Definition Already Exists or I am not Working in a Map Window?

- If you are retrieving a WMS map and there was a previous WMS definition (or you are modifying a WMS map), MapInfo Professional uses the coordinate system that matches the current projection (not necessarily the Map window's coordinate system).
- If there was no previous WMS definition, the current Map window's coordinate system is selected if it can be found in the Projection list.
- If the Map window's coordinate system is not in the Projection list or you are retrieving a WMS map when you are not working in a Map window, MapInfo Professional tries to default to EPSG:4326.
- Finally, if none of these projections are found, the first item in the **Projection** list is selected.

Supported Image Formats for WMS

MapInfo Professional supports the following image formats for WMS:

- PNG
- JPEG (JPG)
- TIFF (GeoTIFF AND TIFF)
- GIF.

Note: Not every format will be available from every Web Map Service.

The OGC WMS specification supports transparent pixel definition for image formats. This allows you to use the images you retrieve as overlays and not solely as the bottom layer of your map.

To set the background to transparent, click the **Transparent** check box in the Open WMS Table or the WMS Table Properties dialog boxes. You can also control the transparency and translucency of the image via **Layer Control > Display > Style Override > Adjust Image Styles**.

The *Help System* contains these related topics:

- *Adding a WMS Server*
- *Editing the WMS Servers List*
- *Retrieving Data from Web Map Services*
- *Setting the Projection for WMS Layers*
- *Projection Issues with WMS Map Data*
- *Editing WMS Layer Settings*
- *Opening WMS .TAB Files*
- *Info Tool SUpport for WMS Layers*
- *Controlling WMS Image Quality When Printing*

Understanding WMS Error Messages

Data returned to the WMS client depends on the availability and status of the WMS server and on the characteristics and status of the maps on the WFS server. These conditions are beyond the control of MapInfo.

The following table lists and explains WMS-related error messages. Some messages consist of two parts, separated by a colon. The information up to the colon is generated by the MapInfo WMS client. The raw data following the colon comes directly from the WMS server. For clarification on those messages, please contact the service provider of the WFS server.

WMS-Related Error Messages

Error Message	Description and Explanation of Message
XML Parsing Error: <*message from XML parser*>	The most likely cause is badly formed XML from the server. The raw data following the colon is transmitted by the MSXML 4.0 parser.
The WMS Server issued the following exception: <*message from server*>	The raw data following the colon is transmitted by the WMS server. This may help you analyze the problem. The WMS server generated an error. For clarification, contact the service provider of the WFS server.
The following error was issued while attempting to access the WMS server: <*message from server*>	There could be a problem with the URL, the server may not be available, or it may have timed out.
The WMS Server returned no data in response to the request.	MapInfo issued a service request, but nothing was received from the server.
Unable to retrieve capabilities from the WMS Server.	The GetCapabilities request from the server failed. This message usually appears paired with another message in the same message window.
The WMS Server returned HTML data rather than the requested format. The specified address may not be a WMS Server or the server could not process the request: <*message from server*>	The raw data following the colon is transmitted by the WMS server. This may help you analyze the problem. The server you are accessing may not be a WMS server. You may see this message *after* accessing a WFS server and seeing a list of WFS layers. This can occur because the Capabilities document provided by the server may contain additional URLs that redirect you to another server (not the one you explicitly selected). That “redirected” server may be down or have another problem.

WMS-Related Error Messages*(continued)*

Error Message	Description and Explanation of Message
The WMS Server returned data which was neither in the requested format nor a recognized WMS service exception: <*message from server*>	The raw data following the colon is transmitted by the WMS server. This may help you analyze the problem. The exception message from the server could not be understood. For example, the exception message may not have been in XML format.
Error accessing temporary file.	It is possible that your disk is full or you might have deleted the temp file while Mapinfo Pro was running.
The WMS Server does not return GetFeatureInfo data in a format supported by MapInfo.	The server may not support GetFeatureInfo.
The WMS Server does not support GetFeatureInfo requests.	The server may not provide GetFeatureInfo in a format understood by MapInfo Pro.
There are no queryable layers in the WMS table for GetFeatureInfo request.	The server may not have a queryable layer. It is possible that a queryable layer changed between the time that you first created the WMS table and subsequently reopened the table.
The WMS Server returned data in <*formatA*> rather than the requested format of <*formatB*>.	MapInfo requested data in the format that the server claims it supports, however the server is returning a different format. For clarification, contact the service provider of the WMS server.
Unable to retrieve feature information from the WMS server.	The GetFeatureInfo request from the server failed. This message usually appears paired with another message in the same message window.

Enhancing Map Data using a Web Feature Service

MapInfo Professional 8.0 and later provides a Web Feature Service (WFS) client to retrieve geospatial GML (Geography Markup Language)2 data using HTTP GET and HTTP POST requests over the Internet or through a private intranet. The WFS client was developed in accordance with the 1.0.0 OpenGIS® Web Feature Service Implementation Specification, which is available online: **http://www.opengis.org/docs/02-058.pdf.**

WFS is similar to WMS (Web Map Service), in that both can provide geographic data via the Internet. But while a WMS server provides raster maps, a WFS server provides raw coordinate data that the client uses to produce a map.

Note: The MapInfo WFS client has been developed in accordance with OGC WFS Specification 1.0.0. Using this client you cannot retrieve data from sites that are compliant with earlier or later versions of the OGC specification.

The WFS client supports GML2 (OGC GML V2.1.1). The OGS WFS Specification states that all servers should support GML2, but may also support other formats. The server provides information on the formats available, and the client makes the request for the data in the format it can use. If the server does not support GML2, it will not be supported by the MapInfo WFS client.

GML2 does not contain any style information. You can provide style information to associate with a particular WFS table.

A WFS request contains a description of query operations that can be applied to one or more features. The client generates the request and posts it to a WFS using HTTP. The web feature server then reads and executes the request.

The **GetCapabilities** operation queries the WFS server for capabilities. Then the MapInfo Professional WFS client can generate a query appropriate for the WFS server and table.

Each table in the WFS server can result in a single MapInfo table. The mapping is always 1-to-1 (unlike WMS, which is many-to-1).

The TAB file retrieved from a WFS server resembles a read-only DBMS linked table. It contains a MAP file and a DAT file, and acts like a read-only native table. Information is stored so that the table can be refreshed from the WFS server.

The sequence of actions can be summarized as follows:

1. After sending a **GetCapabilities** request to a WFS server, the server returns a list of WFS layers (FeatureTypes) that it can provide.
2. The user picks a WFS layer to fetch from the server, MapInfo Professional then sends a **DescribeFeatureType** request to the server. This response is an XML schema that describes the feature.
3. The user can then select which columns and/or rows to fetch.
4. MapInfo Professional sends a **GetFeature** request to the WFS. If the user did not select a subset of columns, all columns will be requested by default.
5. The response is a GML document containing the feature collection. Each feature represents one “record” in the MapInfo table.

There is a list of WFS servers in the client to help you get started in using this functionality.

Note: Since the data you retrieve using the WFS is remote, it may change from time to time. You can refetch your WFS data manually using the refresh process. See *Refreshing your WFS Data* in the *Help System* for more information.

WFS Server Requirements

You must have a working Internet connection whenever you retrieve WFS data. To display GML2 data correctly in the MapInfo Professional Web Feature Service, the server you are requesting information from must:

- **Support V1.0.0 of WFS**. The MapInfo Professional WFS client sends the initial GetCapabilities and specifies version 1.0.0. If the server you are requesting information from does not support the 1.0.0 version, MapInfo Professional cannot use that server and no further operations will be allowed.

- **Respond to GetCapabilities request using Http GET in XML**.
- **Respond to the GetFeature request by returning GML2** (OGC GML V2.1.1). The server's GetCapabilities response should include this information. If the server does not claim to use GML2 as the Result Format for GetFeature, then MapInfo Professional cannot use the server and no further operations will be allowed.
- **Conform to the OGC GetCapabilities schema**. If the server GetCapabilities response does not conform to the schema, MapInfo Professional may not be able to read portions of it. This may mean that MapInfo Professional misses items that the server is trying to communicate, such as feature types (tables), or filters. In some cases, MapInfo Professional won't be able to deal with the server, since necessary information cannot be found. In other cases, MapInfo Professional may miss functionality that the server is trying to provide, such as filters.
- **Support HTTP GET and/or HTTP Post for the DescribeFeatureType and GetFeature requests**. The MapInfo Professional client supports both HTTP GET and HTTP POST. The server should advertise what it accepts for each request in its GetCapabilities response. MapInfo Professional prefers HTTP POST for both operations, so if the server advertises that it supports both HTTP POST and HTTP GET methods for these operations, MapInfo Professional uses HTTP POST.
- **Supply the URL for both the DescribeFeatureType and GetFeature in their GetCapabilities response**. The URL provided must be valid for that request. If the server provides an invalid URL, MapInfo Professional's WFS client cannot work and displays a suitable error message.

The DescribeFeatureType response should be:

- **An XML Schema that contains the information for the table specified only**. If the server returns a schema that contains descriptions for multiple tables, MapInfo Professional cannot parse it correctly, and the operation will fail.
- **A Valid XML Schema.** If not, no further operations can be allowed for that feature type. Without a valid schema, MapInfo Professional cannot create or populate the table. In this case you can either select another table, select another server, or cancel the WFS dialog box.

Note: MapInfo Professional may not handle schemas that are "well formed" but contain invalid XML.

MapInfo Professional checks that the schema returned for DescribeFeatureType is well formed XML, but does not validate the XML. Our WFS client works correctly with many servers that return schema's which contain invalid items, and our developers thought that eliminating these servers because they didn't contain 100% valid XML was too limiting.

Note: MapInfo Professional cannot successfully handle schemas that contain invalid items, such as an invalid character in an element name - for example, "City Type" where the space in the element name isn't valid XML.

While MapInfo Professional may be able to process a schema that contains well-formed but invalid XML, this may cause problems elsewhere, such as during the GetFeature processing. This may cause some confusion. If the XML returned during GetFeature doesn't match the schema, MapInfo Professional may create an empty table without displaying an error.

MapInfo Professional:

- **Doesn't process xsd:include**. All element types must be defined in the schema returned from the DescribeFeatureType request or derived from GML base types.

- **Supports all row filters that the server advertises in the GetCapabilities response with the following constraints**:
  - The filters are OGC-defined filters as specified in the OGC WFS Specification or the OGC Filter Encoding Implementation specification.
  - The filter takes 0 or 1 arguments beyond the column name. This is a user interface constraint. MapInfo Professional's interface is currently not set up to address such filters. This includes the A Between filter, which requires 2 values.
- **Supports MaxFeatures, but not all WFS servers seem to support this option**. While the OGC WFS Specification states that the server should implement this option, our experience has been that some servers ignore MaxFeatures.
- **Treats the Geometry column as mandatory**. While you can filter specific columns, MapInfo Professional always requests the Geometry column from the server. Many servers seem to treat the Geometry column as mandatory and return this column whether it is requested or not.

Note: The GML returned during the GetFeature request should validate against the schema returned during the DescribeFeatureType request. If this is not the case, then MapInfo Professional may not be able to create a table.

If a MapInfo WFS table is open, the user interface automatically enables the refresh process. During the refresh process, users can not change the query that is sent to the WFS server. The data will be refetched from the server using the original query. This refreshed information can then be saved to the table.

The *Help System* contains these related topics:

- *Adding a WFS Server*
- *Adding WFS Client Support*
- *Opening a Web Feature Service Layer*
- *Selecting and Filtering a WFS Layer*
- *Controlling WFS Maximum Features*
- *Changing a WFS Coordinate System*
- *Changing WFS Layer Styles*
- *Handling Retrieved WFS Data*
- *Refreshing your WFS Data*
- *Adding Column Indices to WFS Tables*
- *Overriding WFS Default Timeout Values Locally*

Geocoding using a Geocoding Server

Not everyone in a flood zone loses their homes in a disaster. Accuracy in address matching (geocoding) can mean the difference between an insured being in a flood plain or on dry land. Knowing that information quickly and precisely can mean the difference in thousands of dollars of risk or no risk at all.

For retail customers, an advanced geocoder could be the difference between finding your product in a local store or wasting a trip.

For financial services customers, it could mean locating your best customers quickly when you have an opportunity to share with them.

You can use MapInfo Professional to connect to MapMarker and Envinsa servers to handle advanced geocoding functions.

Geocoding is the process of assigning geographic coordinates to your data, which can be street addresses. Point values assigned to each address turn each record into a geographic object that MapInfo Professional can display on a map. Visualizing your records on a map can make the relationships among your data clearer. You can display your geocoded records against a street map, a postal code centroid map, a county map, or whatever is most appropriate to your needs. You can then use the wide variety of functions available in MapInfo Professional mapping software to perform querying, create thematic maps, create territories, and perform many other types of geographic analysis.

Using the MapMarker and Envinsa Web Services, you have more choices for geocoding. For example, you can choose to geocode your records by street address or by postal code centroid, or by geographic centroids. If you have geocoded some records and some did not geocode successfully, you can set fallback conditions to locate those records. If you geocode and there are no results, poor results, or multiple equal close results, the geocoding server can present you with interactive options so you can select among possible matches or change your input. Further, these web services allow you to set multiple matching conditions when more than one record matches the records you are geocoding and set offsets for placing points right in the geocode properties.

For companies and organizations that use MapMarker and Envinsa servers as a geocoding engine, you can take advantage of the geocoding servers available to your whole enterprise. If your organization makes this server available on your intranet or over the Internet, you can use our geocoding web services from within MapInfo Professional to perform more sophisticated and accurate data geocoding.

Note: IMPORTANT: MapInfo may not have a Geocoding Server with data that includes the geography you are interested in. Please check with your local MapInfo sales personnel to ensure that web services exist for your geography.

What Are MapMarker and Envinsa Geocoding Services?

MapMarker is a powerful geocoding product that assigns coordinates to an address based on how well it matches entries in an Address Dictionary. The precision of the match can vary. For each address you geocode, you may get back a single perfect, street-level match, a list of street-level match candidates from which you choose the best match, or a less precise postal code centroid match, where the point would be located near the center of the postal code area. In the case of a ZIP + 4 centroid match, the location of the point corresponds to the address which is closest to the mid-address of the ZIP + 4 address range. You must have MapMarker 4.0 core to use this web service.

Envinsa provides a wider range of web services than MapMarker and can even provide access to earlier versions of MapMarker. Envinsa can determine these values from a street address or postal code. Envinsa servers require more security than MapMarker, so you will need a user name and password to access them. Keep in mind that the services that are available on an Envinsa server depends on what was installed.

There are many reasons why using a geocoding service with MapInfo Professional is a good business solution.

- *Multiple Data Formats OK*! Since MapInfo Professional can import or open data in many different formats, you can geocode almost any kind of geographically enabled file. You can take advantage of MapMarker or Envinsa's advanced geocoding options using Shapefiles, Excel files, ASCII, Access tables, Oracle and SQL Server tables.
- *Data filtering*. You can use the selection and subselection capabilities of MapInfo Professional to create input for the service using any MapInfo Professional "table," including queries created using SQL Select or tools. For example, if you want to geocode your data based on more than one column, you can specify an input address based on a MapBasic expression that could skip irrelevant characters.
- *Geocode a Little or a Lot*. You can geocode individual records or in batch mode.
- Choose your own Symbols. You have the full range of MapInfo Professional symbols to choose from when plotting your points, or you can create your own custom symbols for the points you are geocoding.
- *Undo works!* Because all of the geocoded results are transacted, you can use MapInfo Professional's revert capabilities to undo the transactions. You can save the geocoded results in the source table or into a completely new table.

Note: IMPORTANT: MapInfo may not have online services with data that includes the geography you are interested in. Please check with your local MapInfo sales personnel to ensure that web services exist for your geography.

Geocoding a Single Address using a Geocoding Service

The process for geocoding a single address for an Envinsa or MapMarker service. Keep in mind that you must set up a geocoding service before you can use this type of geocoding. See **Setting up a Geocoding Server on page 145** and **Setting the Geocoding Server Preferences on page 140** for these instructions.

- For specific instructions, see *Geocoding a Single Address using a Geocoding Service* in the *Help System*.

Understanding the Geocoding Result Codes

The geocoding service returns a result code for each address it attempts to match. The code indicates whether a match was made, the type of match it was, and conveys information about the quality of the match. The result code is an alphanumeric code of 1-10 characters. There are four categories:

- Single close match to street level (S category)
- Postal Code centroid match (Z category)
- Multiple matches during automatic geocoding (M category)
- Non-matches (N category)

Matches in the M category indicate that there is more than one match candidate for the record and the geocoding service has chosen the best one of those candidates. This category displays when you select the automatic option and the geocoding service finds more than one strong match candidate.

For S and Z categories, the first two characters represent the positional accuracy of the match, that is, where the point for the record would spot on a street map. For the S category matches there are eight additional characters that indicate the individual components in the input address that matched. If the geocoding service did not match on a particular address component, the code would contain a dash for that element. For example, a single close match to a street address that matched to all address components except house number would look like: S5-PNTSCZA.

S Category: Single Close Match to Street Level		
S6	matched to a point located at a Postal Code centroid	
S5	matched to a street address	
S4	matched to an interpolated point on the street segment	
S3	matched to a Secondary Postal Code centroid (centerpoint of the Secondary Postal Code boundary)	
S2	matched to a Primary Postal Code centroid (centerpoint of the Primary Postal Code boundary)	
S1	matched to a Postal Code centroid (centerpoint of the Postal Code boundary)	
SX	matched to a street intersection	
S0	single close match, no coordinates available	
	H	matched to house number
	P	matched to street prefix
	N	matched to street name
	T	matched to street type
	S	matched to street suffix
	C	matched to city name
	Z	matched to ZIP Code
	A or U	match came from MapMarker Address Dictionary (A) or customized user dictionary (U)

Z Category: Postal Code Match	
Z6	Postal Code centroid match
Z3	Secondary Postal Code centroid match
Z2	Primary Postal Code centroid match

Z1	Postal Code centroid match
Z0	Postal Code match, no coordinates available
M Category: Multiple Automatic Matches	
M1	multiple matches, point located at Postal Code centroid
M2	multiple matches, point located at Primary Postal Code centroid
M3	multiple matches, point located at Secondary Postal Code centroid
M4	multiple matches, point located at the center of a shape point path (shape points define the shape of the street polyline)
M5	multiple matches, point located at a street address position (highest accuracy available)
M6	multiple matches, point located at point Postal Code location
MX	multiple matches, point located at street intersection
M0	multiple matches, no coordinates available
N Category: Non-matches	
N	No close match

- For specific instructions and related topics, see *Geocoding a Table using a Geocoding Service* in the *Help System*.

Creating Routing Distance and Time Buffers

To find out how many customers are within ten minutes drive of your stores to find all of the suppliers within 15 to 30 miles of your warehouse location, use a Driving Regions web service.

The Drivetime web service uses the latest road networks and fast search algorithms to show the buffer boundaries in time (isochrone) or distance (isodistance) from a specified location. These buffers are different from other MapInfo Professional object or table buffers because they are based on road networks and not straight line distances. Driving region time and distance buffers are calculated based on the speed limits of the individual roads and highways in the road network and the distance or time values you request. Isochrones and isodistances are collectively called isograms.

You can only access this Drivetime data and calculation functionality on an Envinsa 4.0 routing server. The Driving Regions web service helps you create isochrone and isodistance buffers using points in your own data.

An *isochrone* or a *time buffer* is a region that shows the area that a driver can reach from a starting point in a specific amount of time based on the speeds specified in the routing network. For example, if you wanted to put together an event and invite the customers who live within an hour's

drive of the event site, you could create a time buffer for known customers within an hour's drive. The service would then use the average driving speeds defined in the road network to calculate the time buffer from your event. You can then display your data within those buffer regions using a Select or SQL Select statement.

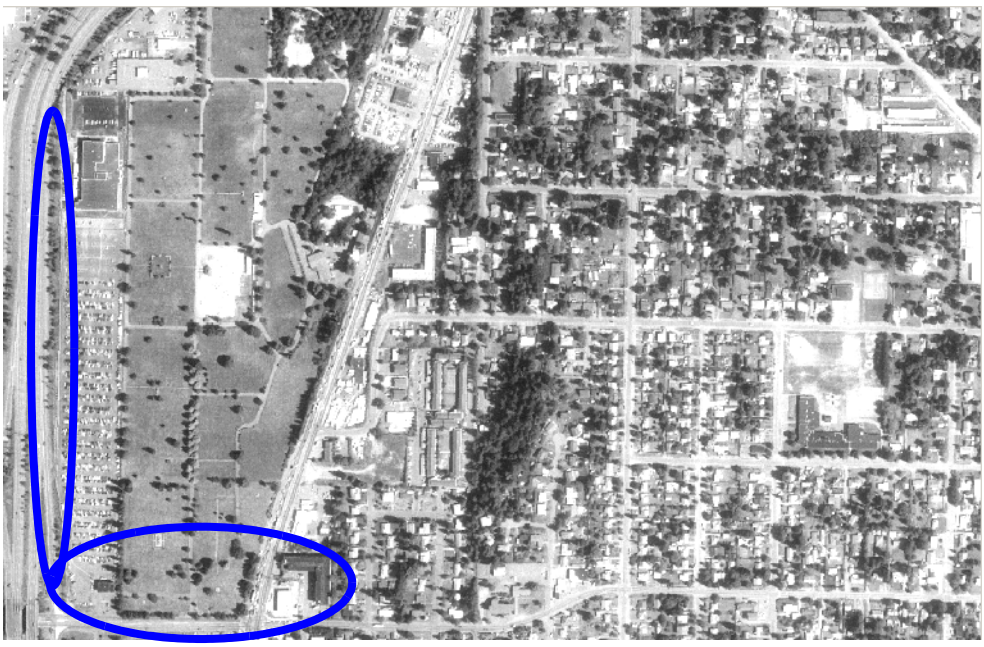
An *isodistance* or a *distance buffer* is a region that shows the area that a driver can reach from the starting point in the same distance. For example, if you want to contact all of the customers who live within 50 miles of the event instead of one hour, you could calculate the distance using the Drivetime web service, using similar logic.

Effectively, you are creating buffers from a point or table of points based on the server's road network for specified times or distances. Using the Driving Region service options, you can control the way this information displays and the number of time and distance buffers you create at a time.

- For more information, see *Creating Time or Distance Buffers for a Table and Rules when Adding a Driving Value* in the *Help System.*

How are Time and Distance Buffers Calculated?

This is a raster map of a portion of a major city, but it could just as easily be your community.



You can travel further on a limited access highway than a local road in the same amount of time due to the difference in speed limits.

In it, you can see limited access highways, major roads with buildings on them, and local streets with homes. The speed limits on these streets vary depending upon their size and use. The routing server manages the speeds for each road type and uses those speeds to calculate the distance a driver could travel in a specific amount of time. For example a driver could get further in an hour on a highway, than on a local road, due to the average speed limits on those roads.

If you think of these speed limits and distances in spatial terms, starting from a particular point, the region the web service could create along a highway would be longer and narrower than the region you would create using a more local road based on the same amount of time or distance request.

That is the concept behind the Driving Region functionality.

Using Driving Region Buffers to Display Data

You can create a driving region buffer (time or distance) to find out how far away your customers are from a particular event or location. We recommend that you add a server as described in the **Setting the Routing Server Preferences** instructions before attempting to create time or distance buffers.

Here are some definitions that may be useful for you as you use this feature.

Holes
Areas within the larger boundary that cannot be reached within the specified time or distance, based on the road network.

Island
Small areas outside the main boundary that can be reached within the specified time or distance.

Offroad Travel
Offroad travel refers to streets that are not part of the server's road network, such as driveways, private roads, or access roads.

Creating Time or Distance Buffers for Objects

You can use a routing server's driving regions network to create time or distance buffers around map objects to see your data in a new way. Keep in mind that these buffers are not like standard straight line circle buffers, but are rather based on the speed that a driver can travel on a particular road network. If you want to create time and distance buffers for an entire table of objects, see *Creating Time or Distance Buffers* in the *Help System*.

Before you begin this process, we recommend that you set up your own default routing server using the instructions in **Setting the Routing Server Preferences on page 142**. If you do not have access to your own routing server, you can access and subscribe to Envinsa Online Services from MapInfo to take advantage of this functionality. To activate your free Envinsa Online Services trial account, see **Accessing Envinsa Online Services at MapInfo on page 476**.

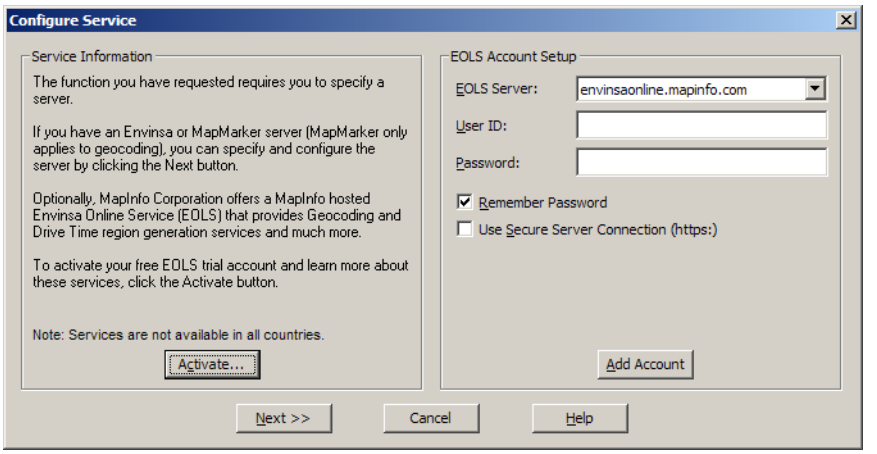
Note: IMPORTANT: MapInfo may not have online services with data that includes the geography you are interested in. Please check with your local MapInfo sales personnel to ensure that web services exist for your geography.

- For specific instructions and related topics, see *creating Time or Distance Buffers for Objects* in the *Help System*.

Accessing Envinsa Online Services at MapInfo

If you want to try out these Geocoding or Driving Region features, but don't have access to a MapMarker or an Envinsa server, MapInfo is providing both trial and subscription access to our public Envinsa server, called Envinsa Online Services or EOLS.

There are two ways to access these web services from within MapInfo Professional. First, when you enter the geocoding or driving regions dialog boxes for the first time, the Configure Service dialog box displays.


Configure Service
Service Information
The function you have requested requires you to specify a server.
If you have an Envinsa or MapMarker server (MapMarker only applies to geocoding), you can specify and configure the server by clicking the Next button.
Optionally, MapInfo Corporation offers a MapInfo hosted Envinsa Online Service (EOLS) that provides Geocoding and Drive Time region generation services and much more.
To activate your free EOLS trial account and learn more about these services, click the Activate button.
Note: Services are not available in all countries.
Activate...
EOLS Account Setup
EOLS Server:
envinsaonline.mapinfo.com
User ID:
Password:
Remember Password
Use Secure Server Connection (https:)
Add Account
Next >>
Cancel
Help

To sign up for this service click **Activate** and follow the instructions to receive a user ID and password, which you can enter into this dialog box. Decide whether you want the system to remember your password[1] and whether you want to use a secure server[2]. Then click **Add Account** to begin using the EOLS server.

You can also access the EOLS is through the Help menu. Select **Help > Connect to Envinsa Online Services** to get started. A landing page will provide you with further instructions, including user name and password information. When you complete your trial period, the Envinsa Online Services will stop accessing the server and you will have the option of subscribing for further use of this service.

Note: IMPORTANT: MapInfo may not have online services with data that includes the geography you are interested in. Please check with your local MapInfo sales personnel to ensure that web services exist for your geography.

1. The password will be saved in the MapInfo services configuration file (MIRoutingServers.xml). These passwords are encrypted.
2. When you choose the secure connection option, you add the step of encrypting all of the communication to and from the server. Consider whether you prefer this option to the standard HTTP connection.

16

Specialized Topics in MapInfo Professional

The topics in this chapter cover the advanced use of MapInfo Professional®.

There are more advanced topics pertaining to embedding maps in other applications, Internet connectivity, working with the MapBasic window, redistricting, and digitizing maps in the MapInfo Professional *Help System.*

Sections in this Chapter:

- Embedding MapInfo Professional Maps 478
- Internet Connectivity and MapInfo Professional. 480
- Redistricting — Grouping Map Objects into Districts 482
- Creating Expressions 485
- Working with the MapBasic Window 494

Embedding MapInfo Professional Maps

MapInfo Professional® brings its power of map display, creation and editing right into your favorite application so that you may build a map where you need it. This chapter covers the basics of OLE and the MapInfo Professional features that you may use in other applications to create dynamic maps.

MapInfo Professional's OLE embedding capability turns your applications such as word processors and spreadsheets into "mini-MapInfo" programs where you can create, display and edit a map for presentation, reporting or publishing. OLE is a process known as Object Linking and Embedding whereby a server application (such as MapInfo Professional) provides information that is stored in a client application that can accept OLE information (such as a word processor). MapInfo Professional's OLE embedding functionality allows you to embed a Map window in any application that accepts OLE objects and use some of MapInfo Professional's features to create, display and edit the map directly in that application.

With MapInfo Professional OLE Embedding you can build the map directly in your OLE container application, or you can create it in MapInfo Professional and drag the Map window into your application for additional editing or output. Because the MapInfo Map Object is a live OLE object, you are in fact running MapInfo Professional in the background. When the Map window is active in the container, the menu and toolbar of your application change to reflect the MapInfo Professional features that become available. This subset of features is called MapInfo Map. (Some OLE containers will create a separate window for the object.) With the click of a button or by choosing a menu command, you have MapInfo Professional functionality in your application where you need it.

- For more information about OLE features and requirement in MapInfo Professional, see the MapInfo Professional *Help System*.

What You Should Know First

Before you get started, it is good to review the system requirements and the registration statement to ensure that you understand where to look for your MapInfo Map Objects.

System Requirements

MapInfo Map is an OLE server application that runs under 32-bit MapInfo Professional. You must install MapInfo Professional 32-bit to engage MapInfo Map. On the client side, only container applications that support OLE embedded objects can run MapInfo Map.

Registering OLE Objects with Containers

Once MapInfo Professional has been installed on your system, the MapInfo Map Object will be registered automatically and listed as a choice in the Object dialog box of any container application that accepts OLE objects.

Menus and Commands Available While Using the MapInfo Map

MapInfo Map replaces all container menus except **File** and **Window** with five MapInfo Professional menus: **Edit**, **View**, **Table**, **Map** and **Help**. Under each menu, selected MapInfo Professional features have been included, as outlined in this section. This section contains summaries of MapInfo Map's menu commands and tools. Be sure to refer to other chapters in this Guide and the rest of the MapInfo Professional documentation set for more complete discussions.

- For more about the specific commands available when working with Map windows, see the *Help System*.

Limitations of OLE

Although MapInfo Map enables you to build a map very easily in your container application, not all of MapInfo Professional's features are available in the context of map embedding. Among them are editing map objects such as regions or polylines, querying a table for further analysis, geocoding to a table in the Map window, or displaying tables in other types of windows (Browser, Graph or Layout windows).

However, with MapInfo Professional's drag and drop capabilities you can still perform these functions in MapInfo Professional and bring over the Map window to your OLE container application for final viewing, formatting and editing enhancements.

Working with Embedded Maps

Now that you have had an introduction to MapInfo Map Object and what it can do for you as you work in another application, let's get down to the specifics of embedding an OLE object.

Although containers vary in their handling of OLE objects, there are some behaviors that are common to all. There are three ways that containers accept embedded OLE objects such as a Map window:

- On the **Insert** menu, click **Object** to choose the object to embed from a list.
- On the **Edit** menu, click **Paste** (or **Paste Special**) to embed an object that was previously copied to the Clipboard.
- Drag and drop from the application to the container using the Drag Map Window tool.

The method you choose depends on which application you are in at the moment (server or client) and how much you want to do to create the final map.

- For more information and related topics, see *Creating a New Map Window in your Container and Bringing a Map Window into your Application* in the *Help System*.

Sharing Documents with Embedded Maps

Once you have created a map in your document, you may want to share it with a colleague. Or you might want to use it on another system. When the document is opened on another system, the MapInfo Map Object displays as a metafile, or picture of the map, in the inactive state. The map is like any other graphic image at this point. If no map editing is necessary, the document can be

printed, reformatted, reorganized, and saved with no special handling required for the map. The map itself can even be resized or repositioned. You cannot, however, change the content of the map since it is not an active OLE object.

To activate the map for editing on another system, your colleague must have access to 32-bit MapInfo Professional and the data used to create the map. Double-click the map to activate the OLE object. MapInfo Professional will prompt for the location of the data files if it cannot find the original location. If the data is not available, cancel out of the Locate Data dialog box. The metafile image is replaced with the MapInfo Professional world map in the active state. To retrieve the original metafile image, close the document without saving and reopening it.

Note: Sharing MapInfo Professional and map data on other systems is limited to the extent of your license agreement(s).

- For more information, see *MapInfo Map Objects vs. Data Map Objects* in the *Help System*.

Using MapInfo Tables with Data Map

Data Map uses MapInfo Professional tables. All of the sample maps provided with Data Map are actually MapInfo Professional tables.

If you have created your own MapInfo Professional tables, you can use your tables in Data Map. However, before you can display your table in Data Map, you must set up your table using the Data Map Data Installer. To launch the Data Installer, double-click the file DATAINST.EXE. (To locate this file, click the **Windows Start** button, and then click **Find**.) Once you have launched the Data Installer, complete the dialog boxes that appear on the screen.

Note that some MapInfo Professional tables cannot be used with Data Map. Specifically:

- Data Map cannot display raster image underlay tables.
- Data Map cannot display a table that is actually defined as a relational join of other tables (such as a MapInfo StreetPro table). To use a street table with Data Map, use MapInfo Professional's Save Copy As command, which saves a street table in a "flat" form that Data Map can use.
- Data Map cannot display point objects that use MapInfo Professional "Custom" symbol styles. (Custom symbols are selected by displaying MapInfo Professional's Symbol Style dialog box, and then selecting "Custom Symbols" from the **Font** drop-down list.) If your MapInfo Professional table contains points with custom symbol styles, those points will be invisible in Data Map.

For more information about Data Map, see the Data Map online Help. For more information about the Data Installer, see the Data Installer online Help.

Internet Connectivity and MapInfo Professional

MapInfo Professional® contains options that allow you to bring the Internet into your mapping sessions, and to bring your maps to the Internet.

Using active objects and the HotLink tool, you can launch files and Internet URLs directly from objects or labels on your map. Active objects provide you with a powerful display tool that allows you to bring information from the Web and other applications together in your map.

These additional sources of information can give your analysis or presentation greater impact. For example, you can link a location on your map to a Web site that gives more information about the location or to an image file that shows certain aspects of the location in more detail.

In addition, you can use the maps you create in MapInfo Professional in your Web pages. The HTML Image Map tool converts a MapInfo Professional map into an HTML image map. Visitors to your Web page will be able to click any region to link to other HTML pages specific to that region.

What Are Active Objects?

Active objects are map objects that are associated with files or URLs. The file can be a bitmap, a MapInfo Professional workspace or table, a MapBasic program, or any type of executable file whose extension is associated with an application installed on your system.

The active object in this map (red triangle) is linked to a webcam web site that displays an erupting volcano.

The *Help System* contains these and other related topics:

- *Creating Active Objects*
- *Using the HotLink Tool in a Map Window*
- *Adding URL Information to your Table*
- *Combining a District's Objects*
- *Saving a New District and Exiting the Redistricter*

HTML Landing Pages

The Landing Pages option allows you to click any region in the HTML image map and link to an HTML landing page specific to that region. You can put whatever content you want into the landing pages, including column information from your table. The user interface enables you to select the columns you want to use and customize the text.

- For more about selecting columns for landing pages and Tooltips, see the *Help System*.

Redistricting — Grouping Map Objects into Districts

One popular use of MapInfo Professional® is to group map objects with a common field into districts or territories. MapInfo Professional's Redistricting feature allows you to create new districts, realign existing districts, all the while doing calculations of the attached data on the fly for instant analysis and decision-making.

What is Redistricting and How Can I Use It?

Redistricting is the process of assigning map objects to groups. As you assign map objects to groups, MapInfo Professional automatically calculates totals for each group of objects, and displays the totals in a special Browser window called the Districts Browser. This process is sometimes known as load-balancing.

When you perform redistricting, you create a number of districts. The exact number of districts needed depends on the nature of your work. You can assign a unique name to each district; thus, if you want to work with four districts, you might call the districts Northeast, Southeast, Northwest, and Southwest. Each district appears as one row in the Districts Browser.

The Districts Browser is different from other Browser windows in several respects:

- You only can select one row at a time from the Districts Browser. You cannot shift-click to select multiple rows.
- The Districts Browser always has one row selected; you cannot cancel the selection of this row by choosing Unselect All.
- When you select a row from the Districts Browser, that row becomes the *target district*. The target district is the district that will be affected by subsequent redistricting operations.

Once you have selected a target district, you assign map objects to that district by selecting the map objects. You can select objects by pointing and clicking, or by performing queries such as SQL Select.

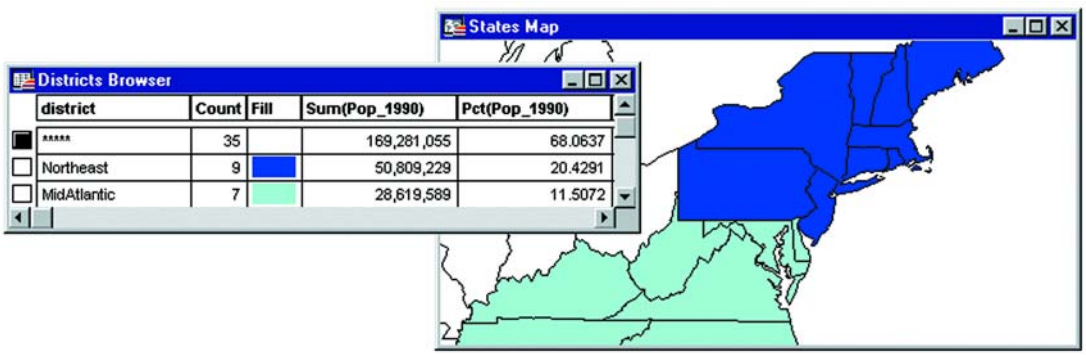
When you select map objects, MapInfo Professional tentatively assigns the selected objects to the target district. MapInfo Professional then recalculates the totals for each district, and displays the new totals in the Districts Browser. You can then examine the contents of the Districts Browser to decide whether you want to make the district assignments permanent.

To cancel the tentative district assignment, cancel the selection of the map objects.

To make the tentative district assignment permanent, choose **Redistrict > Assign Selected Objects**. When you choose Assign Selected Objects, MapInfo Professional stores the target district's name in the rows of the selected objects. Thus, if you assign map objects to a district called Northwest, MapInfo Professional stores Northwest in each object's row.

Each district has its own set of fill, line, and symbol styles. When you assign a map object to a district, the object subsequently appears in the style of the district. Thus, if you choose a solid blue fill for the Northeast district, objects that you assign to Northeast appear in solid blue.

For example, if you have a layer of states, you might want to combine the state boundaries to create sales territories. Each state record includes a field, TOT_SALES, which contains the total sales for the previous year. You would ultimately like to sum up the TOT_SALES field for each state in a given sales territory. Redistricting is gives you the tools for creating the sales territory and combining those TOT_SALES fields from each state's data into one table.



Note: The STATES table used in this example is from the MapInfo Professional Tutorial data, which is available from the MapInfo web site, www.mapinfo.com/miprotutorial.

But that is only one part of the redistricting process. The real power lies in the Districts Browser where you can see on-the-fly updates of district record counts and data totals when you click a map object and assign it to another district. This allows you to perform visual "what if" analysis to achieve district realignments, a process sometimes referred to as load balancing.

When you are satisfied with the distribution, you can make the district assignments permanent. Later, as the need arises, you can change the assignments and try out new distributions.

Redistricting does not create new map objects or permanently change the style of the map objects. Redistricting is simply a dynamic grouping tool that displays map objects that share the same district information as a group. While the map objects are not permanently affected, you can make the district assignments permanent by saving the table.

You can redistrict any mappable table containing region, line, or point objects. The redistrict map will reflect the appropriate fill, line, or symbol style for the objects. The Redistricter limits the number of districts in a table to 594.

You can use redistricting in a wide variety of applications such as creating and managing sales territories, school or voter districts, emergency service coverage areas, delivery routes, natural resource management areas, etc. Use it wherever there is a high degree of fluctuating data and the need to try out different realignment scenarios.

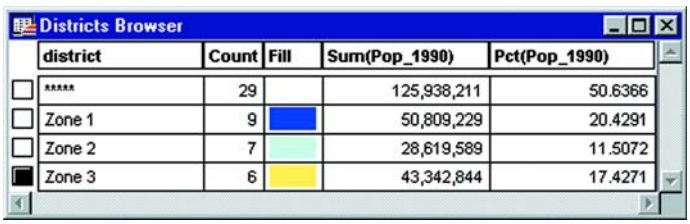
You can use redistricting whether you need to create districts from scratch or realign existing districts.

Before we get into the process, however, there are two key concepts to introduce: the Districts Browser and Target District.

Using the Districts Browser

The Districts Browser is the key to the process of creating and changing districts. While looking like other Browsers in MapInfo Professional, the Districts Browser is actually a dynamic window that allows you to make changes to the groups and recalculates total values on the fly. You can immediately see the results of your changes. You then have the option to make the changes permanent or continue to try out new district realignments.

The Browser window lists the districts as specified in your table, the record count for each district, and aggregate expression columns that contain the net total values of your data. You specify these columns in the New Redistrict window dialog box when you begin the redistricting session.



- For more instructions about creating and adding redistricting features and other related topics, see the *Help System*.

For additional topics in **Redistricting**, see *Setting up the Target District* in the *Help System*.

Using Redistricting

When you calculate the percentage of partial columns (such as population columns that cite income, gender, age, ethnic background, or religious affiliation) you have two calculation methods available. One method calculates the percentage by column so that the sum of all of the entries in every column would be 100%. Another method calculates the percentage by row based on your selected row entry (or sum of entries) so that each percentage entry in the row is calculated based on that row (or sum of entries). For example, in the following table:

A	B	C
1	1	1
2	2	2

The Column method determines the percentages of entries in Column A:

```
Percentage (A1)=A1/(A1 + A2) x 100%; Percentage (A2)=A2/(A1 + A2) x 100%
```

The Row method determines the percentage for entries A1 and B1 based on C1 as a total column:

```
Percentage (A1) = A1/C1 x 100%; Percentage (B1) = B1/C1 x 100%
```

Note: Selecting a valid base entry (or the sum of the entries) is crucial to returning meaningful results. For example, if you choose a value in a population column and a base value from an income column, your results will not be meaningful.

- For more information, see *Creating New Districts* and *Redistricting using the Row Method* in the *Help System*.

Options in Redistricting

To control the order of districts in the Districts Browser, on the **Redistrict** menu, click **Options**. The Redistricter Options dialog box displays. Choose your preferred sort order from among: most recently used, alphabetical, or unordered. You can also choose to show the Browser grid lines and save the options as your default.

As mentioned earlier, the Most Recently Used option can greatly aid you if you have more districts than the Districts Browser can display in a window. Whenever you select a map object that belongs to a district that is not currently visible in the Browser, MapInfo Professional will move that record near the top of the Browser window. You can then more easily set the new target district or view the changes in the data fields as you carry out your load-balancing scenario.

Changing the display of your districts is simple. Click the fill pattern, line style, or symbol in the Districts Browser that represents the district. The Region Style, Line Style, or Symbol Style dialog box displays, where you can change the tools used to display the district.

To save the style changes, you must save the redistricting session as a workspace. **Save Table** will only save the district assignment changes. The styles belong to a thematic layer, not to the table itself. The district changes are applied to the table and, thus, can be saved to the table.

Records with No Graphic Objects

Redistricting involves grouping map objects into districts. If you are redistricting a table that contains records that do not have graphic objects associated with them, keep in mind that MapInfo Professional includes them as well in the Districts Browser. You cannot assign these records to new districts. They will affect your data calculations when you move objects into new districts.

If you have numerous records without graphic objects in your table, it may be best to create and save a subset of the table and run the Redistricter on the new table.

Creating Expressions

Formulating expressions is something like writing sentences. There is a vocabulary of words from which you can draw, and these words have to be combined according to syntactic rules. The syntax of expressions is much simpler than the syntax of English, and the vocabulary is vastly smaller. However, most of us have been using English for years and so it seems easy and natural whereas formulating expressions is, at first, sometimes a bit difficult.

However, just as English has simple sentences and complex sentences, so there are simple expressions and complex ones. Even if you don't get the hang of formulating complex expressions, you can still use all the MapInfo Professional® commands that use expressions. That is because formulating simple expressions is very easy and, at the same time, allows you to work with your data in powerful ways.

- Most of the procedural information for *Creating Expressions* is available in the *Help System*.

Where Expressions Can Be Used

Use the Expression dialog box to formulate mathematical and alphanumeric expressions in several MapInfo Professional dialog boxes. See the Help topic, Specifying an expression.

Expressions are used in the following commands: Select, Update Column, Thematic Mapping, and Layer Control (Labels > Label Options, Label drop-down list). The expression serves a different purpose in different commands.

For example:

- In the **Select** command the expression states a condition that a record in a table must meet in order to be included in a query table.
  - In **Update Column** the expression calculates a value that is then entered into a table.
  - In **Thematic Mapping** the expression calculates a value that is then displayed on a map.
  - In **Label Options**, you use expressions containing string functions to fine tune your labels.

The expressions fall into two broad categories:

- Expressions that must evaluate to true or false.
- Expressions that simply calculate some value.

Expressions that must evaluate to true or false always have a comparison operator and may have multiple clauses connected by logical operators. Use these expressions for selecting objects.

Expressions that simply calculate some value never have a comparison operator and generally do not have multiple clauses. Use these expressions to calculate values for Thematic Mapping, Update Column, and Label With Column in Layer Settings.

Constructing Simple Expressions

You formulate expressions using column (field) names and constants (i.e. specific data values), on the one hand, and functions and operators, on the other. Think of the column names and constants as nouns, and functions and operators as verbs, prepositions and conjunctions. You always need at least one column name or a constant in an expression. How many operators and functions you need depends on what you want to do with your expression.

The simplest possible expression consists of a column name, for example:

1. POP_1990
2. STATE

You could use such an expression in Thematic Mapping to indicate what data is to be represented on the map. In Update Column such an expression would tell MapInfo Professional what data to use in updating a column in the target table.

Here are some slightly more complex expressions:

3. POP_1990 > 17893
4. POP_1990 <= POP_1980
5. COUNTY <> ”Orange”
6. POP_1980 * 1.2
7. POP_1990 / TOTAL_AREA
8. round(POP_1990/TOTAL_AREA,.1)

The first three examples use comparison operators. The first tests to see whether the 1990 population is greater than (>) some constant (17893). The second tests to see whether the value of one column, POP_1990, is less than or equal to (<=) the value of another column, POP_1980. The third tests to see whether or not the county is Orange. When the county does not equal (<>) “Orange” the record is selected. You could use any of these expressions in Select or in the Where Condition clause of SQL Select. These commands allow you to select a subset of the records in a table. The expression defines the characteristics of the subset.

Examples 6 and 7 use arithmetic operators. Example 6 multiplies (*) the value of POP_1980 by a constant (1.2) while example 7 divides one column, POP_1990, by the value of another column, AREA.

Example 8 uses the round function to round the value of the expression “POP_1990/TOTAL_AREA” to the nearest tenth (.1).

Expressions 6, 7 and 8 don’t have comparison operators and therefore they would not be suitable for use in Select or in the Where Condition clause of SQL Select. However, you could use them alone in Thematic Mapping, Update Column, or Select columns in SQL Select.

Setting Filter Criteria for Expressions

A filter criterion is a logical expression that usually compares a column value against some other value. For example, the following filter criterion uses the greater-than operator (>) to test whether the Order_Amount column has a value greater than one hundred:

```
Where Condition: Order_Amount > 100
```

If a query includes the preceding Where Condition clause, MapInfo Professional selects only the rows that have an Order_Amount value greater than one hundred.

The Where Condition field can contain two or more logical expressions if the expressions are separated by the word And or by the word Or. If the expressions are joined by the word *And*, MapInfo Professional only selects the rows that satisfy both criteria. If the expressions are joined by the word Or, MapInfo Professional selects any row that satisfies either criterion.

Filter criteria can use any column in your base table(s), regardless of whether you included the column in the Select Columns field.

Columns can be referred to by name or by number, where the number designates the order the column has in Select Columns. Thus, "col1" and "col6" refer to the first and sixth columns, respectively. The number must be preceded by the letters "col".

- For more instructions and related topics, see the *Using Expressions to Create a New Column* topic in the *Help System*.

Using Mathematical Operators in Expressions

Use the Expression dialog box to formulate mathematical and alphanumeric expressions in several MapInfo Professional dialog boxes. Mathematical operators are often used in creating expressions. The following chart shows the operator's symbol, name, example, and how the operators handle different data types.

Symbol	Description	Example	Detailed Example
+	plus	A + B	Date + Number: Date *04/01/2007* + 4: 04/05/2007 FloatNumber + Date: Date *4* + *232*: 236
-	minus	A - B (subtraction) -A (negative)	Date - Number: Date Number - Date: Date *236* - *4*: 232 *some number* - *some number*: Float
*	times	A * B	some integer *some integer: Integer some number * some number: Float
/	divided by	A / B	some number / some number: Float
^	exponentiation	A ^ B	some number ^ some number: Float

The following calculations are possible:

- Adding numbers to dates to yield another date.
- Subtracting a number from a date to yield another date.
- Subtracting a date from a date to yield a number.

When you add numbers to dates or subtract numbers from dates, MapInfo Professional treats the numbers as specifying a number of days. When you add or subtract a week, you use the number 7.

When you add or subtract a month, you use 30 or 31.When MapInfo Professional subtracts a date from a date, the result indicates a number of days.

Using String Operators in Expressions

+	“concatenation” — connects strings and string expressions.
&	(can be used if preceded by a space)

Strings must be enclosed in double quotes. Consider the following example:

```
”Ms.” + Last_Name
```

When MapInfo Professional evaluates this as part of an expression it places “Ms. “in front of each last name. Note that the string constant (“Ms. “) is in quotes. Similarly,

```
”Hello,” + ”world”
```

gives you “Hello, world.” And

```
”4”+”5”
```

gives you “45.”

Using Comparison Operators in Expressions

Use the **Expression** dialog box to formulate mathematical and alphanumeric expressions in several MapInfo Professional dialog boxes. Comparison operators are often used in creating expressions. The following chart shows the comparison operator symbols and a description.

Operators	Description
=	“equals”
<>	“not equals”
>	“greater than”
<	“less than”
>=	“greater than or equal to”
<=	“less than or equal to”

The *Help System* contains these related topics:

- *Numerical Comparison*
- *String Comparison*
- *Date Comparison*
- *Logical Comparison*

Using Geographic Operators in Expressions

MapInfo Professional has several geographic operators. Use them to select objects on the basis of their spatial relationship to some other object. MapInfo Professional has a special keyword you use with geographical operators: “obj” or “object”. This keyword tells MapInfo Professional that it has to get values based on the graphical objects in the table rather than the tabular data.

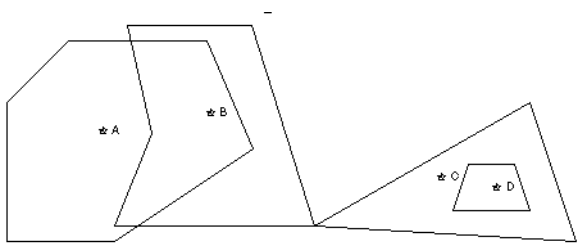
The geographic operators go between the objects being specified. Select the geographic operators from the Operators menu. Here are the geographic operators:

Contains	Object A Contains object B if B’s centroid is anywhere within A’s boundary.
Contains Entire	Object A Contains Entire object B if B’s boundary is entirely within A’s boundary.
Contains Part	Object A Contains Part object B if B’s boundary is partly within A’s boundary.
Within	Object A is Within object B if its centroid is inside B’s boundary.
Entirely Within	Object A is Entirely Within object B if A’s boundary is entirely within B’s boundary.
Partly Within	Object A is Partly Within object B if A’s boundary is partly within B’s boundary.
Intersects	Object A Intersects object B if they have at least one point in common.

“Contains Part” and “Partly Within” are exactly equivalent to “Intersects” -- these are all treated the same way by MapInfo Professional, so the standard syntax “Intersects” is almost universally used.

“Contains” and “Within” are concerned only with objects' centroids.

“Contains Entire” and “Entirely Within” are concerned with the area covered by a region object; the location of the centroid doesn't matter.



Similarly, a polyline can not *contain* a point, but it can *intersect* a point; a point can not be *within* a polyline, but it can *intersect* a polyline.

Note: MapInfo Professional can perform a simple Contains or Within comparison more rapidly than a Contains Entire or Entirely Within. Therefore, unless you must be absolutely sure that objects are completely inside other objects you should use Contains and Within rather than Contains Entire or Entirely Within.

Using Logical Operators in Expressions

"And", "or", and "not" are logical operators. You use them to combine expressions in Select and the Where Condition clause of SQL Select. MapInfo Professional treats each such an expression as a test, which it applies to each record in the table. For each test it gets a yes/no (true/false) answer. MapInfo Professional uses the logical operators to tell it how to combine the individual yes/no answers into an overall yes/no answer: Does the current record meet the selection condition?

Operator	Description
and	is "true" if (and only if) both of its arguments (the expressions it joins together) are true. A record must satisfy both of these conditions if it is to be selected.
or	is "true" if either one, or both, of its arguments (the expressions it joins together) are true. A record need satisfy only one of these conditions if it is to be selected. It is also selected if both of its conditions are satisfied.
not	is "true" if its argument (the expression it applies to) is false. A record is selected if it does not meet the stated condition.

Suppose you want to select all properties that are worth $250,000 or more and are in Columbia county. Each record has to meet two criteria, each of which can be formulated as a simple expression:

9. VALUE >= 250000

10. COUNTY = "Columbia"

You could perform one selection for all properties worth $250,000 or more. Then you could perform another selection on that result, looking for all properties in Columbia county. However, it is easier to combine the two operations into one using the logical operator "and".

11. COUNTY = "Columbia" and VALUE >= 250000

When MapInfo Professional examines a record to see whether or not it meets the condition set by this expression, it makes the two tests: Does COUNTY equal Columbia? Is the VALUE equal to or greater than 250000? When the answer to both of these questions is true (or yes), then the record is accepted into the current selection. When the answer to one or both of the questions is no (or false), then the record is not accepted into the current selection.

Now, what if you want all properties worth $250,000 or more and not in Columbia county? You can use "not" to negate the first clause of expression 33, yielding expression 34:

12. not (COUNTY="Columbia") and VALUE>=250000

Only records where the county is not Columbia satisfy the first clause of expression 34. Now consider expression 35:

13. not (COUNTY="Columbia" and VALUE>=250000)

Expression 35 is simply the negation of expression 33. Any record that would satisfy 33 does not satisfy 35. Any record that does not satisfy 33 satisfies 35.

You can use "or" when you want to specify alternative conditions, such as:

14. COUNTY=”Columbia” or COUNTY=”Greene”

Any record evaluated against this condition is accepted if its county is any one of the two specified counties. One could, of course, use numerical tests as well. For example:

15. TOTAL_AREA>40 or VALUE>250000

This tests to see whether the area is greater than 40 or the value is greater than 250000. When either one is true of a record, then that record is accepted into the selection.

In formulating expressions using logical operators you have to be careful how you use them. The following expression, while it seems OK, does not work:

16. COUNTY=“Columbia” or “Greene”

Judging from its English translation—COUNTY equals Columbia or Greene—this expression should operate just like expression 36 and give us any record containing Columbia County or Greene County. But the rules of computational logic and the rules of English are a bit different.

When MapInfo Professional reads expressions it reads them from left to right. One of the things it has to do is to determine how the items in the expression are grouped. Think of this operation as inserting parentheses into the expression. MapInfo Professional reads expression 35 as though it were grouped like expression 39, which is what we intend.

It reads expression 38 as though it were grouped like 40, which is not at all what we want.

17. (COUNTY=”Columbia”) or (COUNTY=”Greene”)

18. (COUNTY=”Columbia”) or (”Greene”)

Both 39 and 40 have the same first clause. But their second clauses (after the “or”) are quite different. The second clause of 40 is simply a literal string, “Greene.” By convention, MapInfo Professional evaluates a record against a literal string as being true if that record is not blank. When MapInfo Professional evaluates records against expression 40, all non-blank records are evaluated as true and be accepted into the selection. It does not make any difference how a record evaluates on the first clause. Any non-blank record evaluates as true on the second clause, and one “true” is all it takes to evaluate the entire expression as true.

Let us consider one final example, which is the negation of expression 36:

19. not (COUNTY=”Greene” or COUNTY=”Columbia”)

Expression 39 is satisfied if the county is Greene or if it is Columbia, but not if it is Montgomery or Warren. Expression 41 is satisfied by any county other than Greene or Columbia, including Montgomery and Warren.

The *Help System* contains these related topics:

- *Numeric Clauses*
- *String Clauses*
- *Date Clauses*
- *Keyword Clauses*

Understanding Operator Precedence

When MapInfo Professional evaluates expressions it needs to know which components of an expression to evaluate first. This is called precedence. By convention, certain operators are assigned different levels of precedence. Those with the highest level are evaluated first. The following table lists MapInfo Professional's operators in the order in which they are evaluated. Exponentiation evaluates from the right. This affects expressions with multiple exponents: 2 ^ -3 ^ -4 = 2 ^ (- (3 ^ (-4)))

Operators at the same level of precedence are evaluated from left to right.

Highest Priority:	Parenthesis
	Exponentiation
	Negation
	Multiplication, Division
	Addition, Subtraction
	Geographic operators, Comparison operators
	Not
	And
Lowest Priority:	Or

For example, the expression 3+4*2 produces a result of 11. That is because multiplication has a higher precedence than addition and is performed first, in effect:

```
3+4*2=
3+8=
11
```

We can add parenthesis to force MapInfo Professional to do the addition first:

```
(3+4)*2=
7*2=
14
```

Now consider expression 60, which is intended to select all records July or September of 1989.

20. year(RECEIVED)=89 and month(RECEIVED)=7 or month(RECEIVED)=9

Because "and" has higher precedence than "or", MapInfo Professional treats this expression as though "year(RECEIVED)=89 and month(RECEIVED)=7" was enclosed in parentheses.

21. (year(RECEIVED)=89 and month(RECEIVED)=7) or month(RECEIVED)=9

In this case, any record for July of 89 or for September of any year would be selected. That's probably not what you want. However, by adding parentheses to the second expression, you can get this:

22. year(RECEIVED)=89 and (month(RECEIVED)=7 or month(RECEIVED)=9)

In this expression, the parentheses tell MapInfo Professional that “month(RECEIVED)=7” and “month(RECEIVED)=9” are alternatives in the second clause of the expression. MapInfo Professional treats this the same as it treats number 53 above.

Note: When you are not sure how MapInfo Professional evaluates an expression with several operators, you should use parentheses to group elements as you want them.

Using Functions in Expressions

Functions take data values and perform some operation on them to produce a new value. Functions have the following form:

SomeFunction(parameters)

Most of MapInfo Professional’s functions take one or two parameters. A parameter can be a column or another expression. MapInfo Professional uses the keyword “obj” or “object” with the geographic functions: Area, CentroidX, CentroidY, ObjectLen, and Perimeter. This keyword tells MapInfo Professional that it has to get values based on graphical objects in the table rather than tabular data.

- For more information about specific functions, see the *Help System*.

Working with the MapBasic Window

This section allows advanced MapInfo Professional® users to go behind the scenes and take advantage of functions that enhance the use of MapInfo Professional through the MapBasic window. MapBasic® is MapInfo Professional’s programming language that allows you to customize and automate MapInfo Professional functionality. When MapBasic was created, the MapBasic Window feature was added to MapInfo Professional as a means of testing and debugging code for an application. It became apparent that the MapBasic window is also a useful tool to MapInfo Professional users for doing certain tasks such as complex selections and queries based on object information.

The MapBasic window is limited to selected commands from the MapBasic programming language. The MapBasic window can take commands line by line. It does not include the capability for looping, interapplication communication, and other more complex commands. If you find yourself using the MapBasic window often, you may want to consider transferring your code to a MapBasic application that will automate the process.

Note: There is a comprehensive list of MapBasic functions and statements you can use from the MapBasic window in the *Help System*.

Accessing the MapBasic Window

To access the MapBasic window, on the **Options** menu, click **Show MapBasic Window**. The MapBasic window displays on your screen. As with any other window, you may resize it or move it to a new location. The window allows you to enter MapBasic code or to view MapBasic code as it is generated by MapInfo Professional.

To see how MapInfo Professional carries out a select statement:

1. Open the MapBasic window and then open the WORLD table.
2. On the **Query** menu, click **Select**.
3. Type in the expression `Pop_1994 > 1000000`. Make sure that the Browse Results box is checked.
4. Click **OK**. The syntax for these commands appears in the MapBasic window as follows:

```
Open Table "C:\MAPINFO\DATA\WORLD\WORLD.tab" Interactive
Map From World
select * from World where Pop_1994 > 1000000 into Selection
browse * from Selection
```

The first line is a result of opening the WORLD table. The second line of code is written automatically because the WORLD table displays in a Map window by default. The third line is the syntax for the select statement. The fourth line is the result of checking the Browse results box.

You can also enter MapBasic commands into the MapBasic window. Position your cursor under the browse from Selection line. Type the following:

```
Map from Selection
```

Press **Enter** after the line, and the command executes. You should see your selection displayed in a Map window.

As stated before, the MapBasic window was primarily designed to assist MapBasic programmers. You can statements and functions in the MapBasic window such as Buffer( ) function or Insert statement.

Refer to the MapBasic *Reference Guide,* which is located in the Documentation subfolder of your installation directory to find the appropriate usage and syntax for these statements and functions. It provides a comprehensive guide to MapBasic programming statements and functions along with examples.

Running a MapBasic Program

Use Run in the Tools menu to run a MapBasic program. MapBasic is a programming language that you can use to customize or automate MapInfo Professional. To create MapBasic applications, you need the MapBasic compiler, which is a separate product. However, you do not need the MapBasic compiler to run a completed MapBasic application.

MapInfo Professional comes with an assortment of completed MapBasic applications. Some examples include:

- Symbol application (symbol.mbx). Creates custom symbol shapes.
- Scale Bar application (scalebar.mbx). Annotates a map with a distance scale.
- Named Views application (nviews.mbx). Assigns a name to the current map view and use that name to return to that view later.
- Overview application (overview.mbx). Opens a second Map window that displays an overview of the current map (also referred to as an *area detail map*).

To run a MapBasic application:

1. Choose **Tools > Run MapBasic Program**. The Run MapBasic Program dialog box displays.
2. Choose a directory.
3. Choose an application from the list (MapBasic applications have an .mbx extension).
4. Click **OK**.

MapInfo Professional then runs the MapBasic application.

Running a MapBasic Program Using a Startup Workspace

You can use a startup workspace to run a MapBasic application. However, you cannot create this kind of workspace using Save Workspace As. When you want to run a MapBasic application in your startup workspace, you need to create the workspace with a text editor.

1. Place the following into an ASCII file:

```
!workspace
!version 700
run application "someprog.mbx"
```

2. Replace "`Someprog.app`" with the name of the MapBasic application you want to launch from the startup workspace.
3. Name this file STARTUP.WOR.
4. Place this file in your MapInfo Professional program directory or in your home directory.

The *Help System* contains these and other related topics:

- *Copying the Contents of the MapBasic Message Window*
- *Issuing Commands through the MapBasic Window*
- *Examples of MapBasic Programs*
- *Creating Circles around Points using the MapBasic Window*
- Most of the procedural information for *Digitizing Maps with MapInfo Professional* is available in the *Help System*.

Glossary of Terms

Term	Definition
3DMap	A window that allows you to view your maps containing continuous grids from various viewpoints in 3D Format.
Add Node Button	Use the Add Node button to add a node to regions, polylines, and arcs. You can add nodes when the Reshape tool is in effect. Adding nodes can give more precision to your object.
Address Dictionary	The search dictionary used for matching addresses during geocoding.
Alias	The name assigned to an expression or a column when you are working in the **Select Columns** field in the SQL Select dialog box. This name appears as the column title for that expression or column in a Browser.
Application	A computer program used for a particular kind of work, such as word processing. Application is often interchangeable with the word program.
Arc Button	The Arc button allows you to access the Arc tool. Use the Arc tool to draw an arc the size and shape of one quarter of an ellipse. Once you have created an arc, you can reshape it to the desired size.
ASCII	The acronym for American Standard Code for Information Interchange. ASCII is a standard code used in most microcomputers, computer terminals, and printers for representing characters as numbers. It not only includes printable characters, but also control codes to indicate carriage return, backspace, and so forth.
Assign Selected Objects Button	Use this button to permanently assign all selected map objects to the target district.
Axis	Used in a graph, these are graduated lines bordering the plot area of a graph. Location coordinates are measured relative to the axes. By convention the X-axis is horizontal, the Y-axis is vertical.
Bar Chart	A type of thematic map that displays a bar chart of thematic variables for each record in a table from which the map is based.
Base Map	Usually the dominant or underlying layer in a given map. *(These are typically the data layers that MapInfo® offers as ready products.)* Users usually layer their own data on top of these base maps or use these base maps to geocode or to make new layers. Examples are joining industry data to postal code boundaries for analysis and then combining arrangements of the postal codes into new territory layers.
Base Table	A permanent table, which is part of a map, as opposed to a query table, which is temporary. You can edit the contents of base tables, and you can change their structure (by editing, deleting, reordering columns and adding or deleting graphic objects).

Term	Definition
Bitmap	A screen image displayed as an array of dots or bits. Software usually generates either bit-mapped (raster) or object-oriented (vectored) files. MapInfo Professional can work with both.
Boundary Region	In GIS a boundary is a region on a map enclosed by a border. Cambria County, Manitoba, and Argentina would all be represented as boundaries on a map. Note that a single boundary could encompass several polygons. Thus, Indonesia is a single boundary but consists of many polygons.
Boundary Select Button	The Boundary Select button allows you to access the Boundary Select tool. Use the Boundary Select Tool to search for and choose all the objects within a given region, such as a state or county boundary, a police patrol district, a sales territory, and so forth.
Browser	A window for viewing a table (or database, spreadsheet or text file) in tabular form.
Buffer	A type of proximity analysis where areas or zones of a given distance are generated around selected map objects. Buffers are user-defined or can be generated for a set of objects based on those objects' attribute values. The resulting buffer zones form region objects representing the area that is within the specified buffer distance from the object.
Cadastral	A map set used to graphically define the cadastre or land ownership in a given area. A tax map is an example of a cadastral map. The land registration, assessment roles, and tax maps comprise the cadastre.
Cancel Button	A command button for closing a dialog box without making changes.
Cartesian	A coordinate system using an x,y scale not tied to any "real-world" system. Most CAD drawing uses this method of registering objects (for example, a drawing of a ball-bearing assembly, floor plans). If a drawing uses Cartesian coordinates, one corner of the drawing probably has coordinates 0, 0.
Cartesian Coordinates	The conventional representation of geometric objects by x and y values on a plane.
Cartographic Legend	A MapInfo Professional legend window that enables you to display cartographic information for any map layer in the Map window.
Cartography	The art and science of making maps. In GIS it is also the graphic presentation and visual interpretation of data.

Term	Definition
Centroid	Usually the center of a map object. For most map objects, the centroid is located at the middle of the object (the location halfway between the northern and southern extents and halfway between the eastern and western extents of the object). In some cases, the centroid is not at the middle point because there is a restriction that the centroid must be located on the object itself. Thus, in the case of a crescent-shaped region object, the middle point of the object may actually lie outside the limits of the region; however, the centroid is always within the limits of the region. In MapInfo Professional, the centroid represents the location used for automatic labeling, geocoding, and placement of thematic pie and bar charts. If you edit a map in Reshape mode, you can reposition region centroids by dragging them.
Change View Button	This button allows you to change the zoom, map scale, and window centering aspects of the Map or Layout that currently displays.
Check Box	A small square box that appears in a dialog box. You can click in the check box or on the text in order to select the option. Check boxes are generally present when multiple options can be selected at one time.
Click	To press and release a mouse button quickly.
Column	A column in a Browser corresponds to a field in a table. A column contains a specific type of information about an object, such as Name, Abbreviation, Land area, Price, Population, and so forth. The information for each object is listed on a row in the Browser.
Command	A word or phrase, usually found in a menu, that displays a dialog box and/or carries out an action.
Conflict Resolution	When conflicts exist between the data residing on a remote database and new data that you want to upload to the remote database via a MapInfo Professional linked table. The conflict resolution process is invoked whenever an attempt to save the linked table detects a conflict in an update.
Control Menu	A menu activated through the Control Menu Box located in the upper left corner of all windows. The control menu is used to resize, move, maximize, minimize, or close the window.
Control Points	The points on a raster image whose coordinates serve as a reference for associating earth coordinates with any location on the image. See **Registration on page 510**.
Coordinate	An x,y location in a Cartesian coordinate system, or a Latitude, Longitude location in an earth coordinate system. Coordinates represent locations on a map relative to other locations. Earth coordinate systems may use the equator and the Greenwich prime meridian as fixed reference points. Plane coordinate systems describe a two-dimensional x,y location in terms of distance from a fixed reference and are usually in the first quadrant so that all coordinates are positive numbers.

Term	Definition
Coordinate System	A coordinate system is used to create a numerical representation of geometric objects. Each point in a geometric object is represented by a pair of numbers. Those numbers are the coordinates for that point. In cartography, coordinate systems are closely related to projections. You create a coordinate system by supplying specific values for the parameters of a projection. See **Cartesian Coordinates on page 499**, **Projection on page 509**, and **Spherical Coordinates on page 511**.
Cosmetic Layer	The topmost layer of a Map window. Objects may be placed in this layer such as map titles and graphic objects. It is always displayed, and all objects placed in the Cosmetic Layer must be saved to a new or existing layer.
Data Aggregation	A process that occurs when combining separate map objects into a single object. MapInfo Professional calculates what the column values for the new object should be, based on sums or averages of the values of the original objects.
Data Disaggregation	A process that occurs when splitting a map object(s) into smaller parts where MapInfo Professional splits the data associated with the map object(s) into smaller parts to match the new map objects.
Data Sources	An ODBC data source is an SQL database and the information you need to access that database. For example, an SQL Server data source is the SQL Server database, the server on which it resides, and the network used to access that server.
Database	Any organized collection of data. The term is often used to refer to a single file or table of information in MapInfo Professional.
Decimal Degree	The decimal representation of fractions of degrees. Many paper maps express coordinates in degrees, minutes, seconds (for example, 40_30*i*10*I*), where minutes and seconds are fractions of degrees. 30 minutes equal half a degree, and 30 seconds equal half a minute. MapInfo Professional, however, expresses coordinates in decimal degrees (for example, 72.558 degrees), where fractions of degrees are expressed as decimals. Thus, the longitude: 40 degrees, 30 minutes, would be expressed in MapInfo Professional as 40.5 degrees.
Default	The value or option used in the absence of explicit specification. Often the original setting or value for a variable.
Degrees Longitude, Degrees Latitude, Decimal Degrees	Degrees (longitude and latitude) are coordinates used to represent locations on the surface of the earth. Longitude, or X-coordinate, represents a location's east-west position, where any location west of the prime meridian has a negative X value. Latitude, or Y-coordinate, represents a location's north-south position, where any location south of the equator has a negative Y value.
Derived Column	In a table created through the SQL Select, a derived column is one created by using an expression. The column is derived in the sense that it isn't just a copy of the data in one of the tables being accessed by the SQL Select command.

Term	Definition
Derived Field	The same as a derived column.
Deselect	The process of undoing a selection. The object or area you deselect will not be affected by subsequent commands. Performed by selecting another area, by clicking in a blank area, or by executing the Unselect All command.
Digitizer, Digitizing Tablet	An electronic device that lets you trace a paper map into a GIS or CAD package. The digitizer consists of a table (or tablet) onto which you attach a paper map. You then can trace the map by moving a hand-held, mouse-like device known as a cursor, or puck, across the surface. Digitizing a map produces vector data as the end result.
Districts Browser	A special browser that displays when redistricting. It differs from other Browser windows in the following respects: one row can only be selected at one time, one row is always selected, and the selected row becomes the target district into which you can add other objects.
Dot Density Map	A type of thematic map that carries information by showing a large number of tiny dots, wherein each dot represents some specific unit quantity. For example, for a population dot density map each dot might represent 10,000 people.
Drawing Toolbar	A MapInfo Professional window containing twelve buttons that access tools for drawing and modifying objects on your map or layout.
Edit Handle	The small boxes that appear at the four corners of the minimum bounding rectangle of an object in an editable layer of a Map window or in a Layout window.
Ellipse Button	The Ellipse button allows you to access the Ellipse tool. Use the Ellipse tool to create elliptical and round objects.
Export	The process whereby a program saves information in a file to be used by another program.
Expression	A statement containing two parts: 1) column names and constants (i.e., specific data values), and 2) functions (for example, area) and operators (for example, +, -, >), in order to extract or derive information from a database. Expressions are used in *Select, SQL Select, Update Column, Create Thematic Map,* and *Label with Column.*
Field	A field in a table corresponds to a column in a Browser. A field contains a specific type of information about an object, such as, name, abbreviation, land area, price, population, and so forth. The record for each object consists of that object's values for each of the fields in the database.
File	A collection of information that has been given a name and is stored on some electronic medium such as a tape or disk. A file can be a document or an application.
Fill Pattern	The design and color used to fill a closed object.
Font	A character set based on a particular style used for text characters.

Term	Definition
Frame Button	The Frame button allows you to create frames in a layout. Each frame can display a map, graph, Browser, map legend, graph legend, Info window, statistics window, and message window or, it can be an empty frame.
Generalization	The process of simplifying a data set to a size that can be easily manipulated and represented. For example, a river may have many twists and turns; however, if a map covers a very large area, the river may be represented as a straight line. Similarly, in a map of a very large area, a city might be represented as a point marker.
Geocode	The process of assigning X and Y coordinates to records in a table or database so that the records can be displayed as objects on a map.
Geographic Information System (GIS)	An organized collection of computer hardware and software designed to efficiently create, manipulate, analyze, and display all types of geographically or spatially referenced data. A GIS allows complex spatial operations that are very difficult to do otherwise.
Grabber Button	The Grabber Button allows you to access the Grabber tool. Use the Grabber tool to reposition a map or layout within its window.
Graduated Symbols Map	A type of thematic map that shows symbols (point objects) in a variety of sizes to indicate which objects have higher or lower numerical values.
Graph window	A window that displays numerical data in the form of a graph.
Graticule	A grid of horizontal (latitude) and vertical (longitude) lines displayed on an earth map, spaced at a regular distance (for example, every five degrees, every fifteen degrees). Used to establish a frame of reference.
Grid Surface Map	A type of thematic map that displays data as continuous color gradations across the map. This type of thematic map is produced by an interpolation of point data from the source table. A grid file from the data interpolation is generated and is displays as a raster image in a Map window.
Heads-Up Digitizing	A method of digitizing where the user creates vector objects by tracing over a raster image displayed on the screen. Thus, heads-up digitizing does not require a digitizing tablet.
Help Button Bar	A bar located at the top of the Help Window that contains buttons you use to move to Help topics.
Horizontal Scroll Bar	The Horizontal scroll bar appears at the bottom of the MapInfo Professional window. Use the horizontal scroll bar to move left and right. The scroll box inside the scroll bar indicates your horizontal location. You can use the mouse to scroll to other parts of the window.
Hot Views	MapInfo Professional technology that automatically updates all the windows you have open for a particular table when you make a change in any one of the windows. For example, if an item is selected in a Map window, it will be selected in all other Map windows and Browsers you have open for that table.
Import	The process whereby a program loads a file that is the output of another program.

Term	Definition
Individual Values Map	A type of thematic map that shades records according to individual values.
Inflection	The process of deviating the color in ranged thematic maps to emphasize some numerical significance. In thematic mapping we insert a new color between the top and bottom color for second interpolation of data. For example, suppose we were showing population growth with blue representing an increase in population growth and red representing a decrease in population growth. We could have white as the inflection color for a range that has zero or almost zero population growth, so that lighter shades of blue would represent a smaller population growth and lighter shades of red would represent a smaller decline in population.
Info Button	The Info button allows you to access the Info tool. Use the Info tool to select a location on your map, including multiple overlapping objects and display a list of all objects at that location. You can then choose an object from the list and view the tabular data for that object.
Islands	Small areas outside the main boundary that can be reached within the specified time or distance.
IsoChrone	An IsoChrone is a polygon or set of points representing an area that can be traversed from a starting point in a given amount of time along a given road network.
IsoDistance	An IsoDistance is a polygon or set of points representing an area that can be traversed from a starting point travelling a given distance along a given road network.
Isogram	An Isogram is a map that displays a set of points that satisfy a distance or time condition. Isograms are either IsoChrones or IsoDistances.
Join	The process of creating a relational link between two tables (databases).
Latitude	The horizontal lines on a map that increase from 0 degrees at the Equator to 90 degrees at both the North (+90.0 degrees) and South (-90.0 degrees) poles. Used to describe the North-South position of a point as measured usually in degrees or decimal degrees above or below the equator.
Layer	A layer is a basic building block of MapInfo Professional maps and consists of a table with graphic and text settings like style override, labeling, and zoom layering. Maps are made of one or more superimposed layers (for example, a layer of street data superimposed over a layer of county or postal code boundaries) which you can design to convey geographical or statistical information. Typically, each map layer corresponds to one open table. Cosmetic Layers contain map objects that represent temporary map annotations (for example, text objects). Cosmetic Layers contain map objects that represent temporary map annotations (for example, labels). See **Cosmetic Layer on page 501** and **Table on page 512**.

Term	Definition
Layer Control Button	The Layer Control Button allows you to access the Layer Control dialog box. This dialog box allows you to specify how the various tables in a Map window are layered and displayed. See **Accessing Layer Control on page 162**.
Layout Window	A window where you arrange and annotate the contents of one or several windows for printing.
Legend	The part of a map, which explains the meaning of different colors, shapes, or fill patterns used on the map. See also **Cartographic Legend on page 499**.
Legend Frames	Each legend window contains one or more legend frames each corresponding to a style or theme layer in the Map window.
Legend Window	A window containing legend frames. You can create more than one legend window for each map. The legend window can contain more than one frame. For example, you can have one legend window containing four legend frames, or you can have four legend windows, each containing one legend frame.
Legend Window Button	Use the **Legend Window** button to display the Legend window associated with maps or graphs.
Line, Line Object	A map object defined by a set of sequential coordinates that may represent the generalized shape of a geographic feature (for example, street centerlines, railroads, cables). A MapInfo street map is a collection of thousands of line objects.
Line Button	The Line button allows you to access the Line tool. Use the Line tool to draw straight lines.
Line Style Button	Use the Line Style button to access the Line Style dialog box. The Line Style dialog box allows you to set the line type, thickness and color of line objects (lines, arcs and polylines) and borders of closed objects. You can also change the type, thickness and color of objects you are editing.
Linked Table	A linked table is a special kind of MapInfo table that is downloaded from a remote database and retains connections to its remote database table. You can perform most operations on a linked table that you do for a regular MapInfo table.
Longitude	The vertical lines on a map, running from the North to South poles, used to describe the east-west position of a point. The position is reported as the number of degrees east (to -180.0 degrees) or west (to +180.0 degrees) of the prime meridian (0 degrees). Lines of longitude are farthest apart at the Equator and intersect at both poles, and therefore, are not parallel.
Longitude/ Latitude	MapInfo Professional's default coordinate system for representing geographic objects in a map.
Main Toolbar	A window containing buttons for choosing tools, accessing dialog boxes, and showing or hiding windows.

Term	Definition
Map Catalog	The MapInfo map catalog stores information about the location of spatial columns on the DBMS. There must be one catalog per database. The EasyLoader application can create this catalog for each database: Oracle 8, 9, Informix, SQL Server, and MS Access. Additionally, you can create a map catalog manually with instructions in the MapInfo Professional *User Guide*. This is a one-time only task per database and is required before any tables on that database can be mapped in MapInfo Professional.
Map Scale	A statement of a measure of the map and the equivalent measure on the earth. Often expressed as a representative ratio of distance, such as 1:10,000. This means that one unit of distance on the map (for example, one inch) represents 10,000 of the same units of distance on the earth. The term *scale* must be used carefully. Technically, a map of a single city block is *large–scale* (for example, 1:12,000), while a map of an entire country is *small–scale* (for example, 1:1,000,000). A 1:1,000,000 map is considered small-scale because of the small numeric value obtained when you divide 1 by 1,000,000.
Map Segment	In a street map, a segment is a single section of the street. In urban maps, segments are generally one block long. Address ranges are stored at the segment level.
MapBasic	The programming language used to customize and/or automate MapInfo Professional. To create MapBasic applications, you need the MapBasic compiler, which is a separate product. However, you do not need the MapBasic compiler to run a compiled MapBasic application.
Map Scale	A statement of a measure of the map and the equivalent measure on the earth and often expressed as a representative ratio of distance, such as 1:10,000. This means that one unit of distance on the map (e.g., one inch) represents 10,000 of the same units of distance on the earth. The term *scale* must be used carefully. Technically, a map of a single city block is *large-scale* (e.g., 1:12,000), while a map of an entire country is *small-scale* (e.g., 1:1,000,000). A 1:1,000,000 map is considered small-scale because of the small numeric value obtained when you divide 1 by 1,000,000.
Map window	A window that allows you to view a table as a map.
Meridian	A line or a portion of a line running from the North to the South pole. A longitudinal line.

Term	Definition
Military Grid Reference System	The U.S. Military Grid Reference System (MGRS) is a grid reference system that MI Pro supports when displaying maps in a Map window. It is the military version of the civilian-use Universal Transverse Mercator (UTM) grid system. Military grid references are very similar to the mathematical Cartesian x,y system in which coordinates are giving in terms of x (easting) and y (northing). In this system, the world is generally divided into 6° by 8° geographic areas, each of which is given a unique identification, called the Grid Zone Designation. These areas are covered by a pattern of 100,000-meter squares. Each square is identified by two letters called the 100,000-meter square identifications. A reference keyed to a gridded map of any scale is made by giving the 100,000- meter square identification together with the numerical location. Numerical references within the 100,000-meter square are given to the desired accuracy in terms of the easting (E) and northing (N) grid coordinates for the point. The Grid Zone Designation usually is prefixed to the identification when references are made in more than one grid zone designation area.
Minimum Bounding Rectangle (MBR)	For any given map object, the smallest rectangle that completely encompasses the object.
Native Projection	The projection in which a map's coordinate points are stored. MapInfo Professional allows you to display maps in other projections, but not as fast as displaying maps in their native projection.
Node	An end-point of a line object, or an end-point of a line segment which is part of a polyline or region object.
Non-Earth Map	A map in which objects are not explicitly referenced to locations on the earth's surface. Floor plans are typical examples.
ODBC Drivers	An ODBC driver is a dynamic-link library (.DLL) file that MapInfo Professional uses to connect to an SQL database. Each type of SQL database requires a different ODBC driver.
ODBC Table	An ODBC table is a table residing in a remote SQL database.

Term	Definition
OSGB MasterMap GML Files	Many of our international customers want to display MasterMap GML files developed by the Ordnance Survey of Great Britain (OSGB). We provide support for some of the Topography features (OSGB version 2.0), Topographic Area, Lines and Points, Cartographic Symbols and Boundary Lines. We maintain support for these features and add support for Cartographic Text and Departed Features. MapInfo Professional will continue to support GML files as the OSGB updates the schema that underlies the GML technology. As the GML format gets more sophisticated in its support of additional layers, feature types, and attributes, we will continue to provide full support for those changes. Currently, we support the OSGB recommended styles by mapping the style definitions to existing MI Pro styles. Where it is not possible to render complicated fill patterns, we use the simple dot screen that the OSGB recommended to us. The OSGB style mapping to MapInfo styles is hard coded so it cannot be changed. For more information about OS MasterMap see www.ordsvy.gov.uk/os_mastermap/home/home.htm.
Outer Join	A type of multi-table join where all the records in the specified tables are included in the result table, even records that do not match the join criteria. MapInfo Professional does not perform outer joins.
Pack	The process of compressing MapInfo tables so that they use less disk space.
Pie Chart Map	A type of thematic map that displays a pie chart of thematic variables for each record in the table from which the map is based.
Pin Map, Push-Pin Map	A type of map named after the practice of inserting push-pins into a wall map. A pin map features point objects. Geocoding a database is one way of creating a pin map.
Pixel	The acronym for picture element. The smallest dot that can be displayed on a computer screen. If a screen is described as having a resolution of 1,024 x 768, the screen shows 1,024 pixels from right to left, and 768 pixels from top to bottom. Each character, object, or line on the screen is composed of numerous pixels.
Point, Point Object	A map object defined by a single X,Y coordinate pair. Each point object is represented by a symbol style (for example, circle, square, triangle, etc.).
Point Size	A unit of measurement equal to 1/72 of an inch. Used to measure character size.
Pointer	An arrow-shaped cursor on the screen that can be manipulated by a mouse.
Polygon, Polygon Object	A simple bounded region, simple in the sense that it does not consist of more than one polygon (where a boundary can consist of more than one polygon). The Polygon tool creates a single polygon.
Polygon Button	The Polygon button allows you to access the Polygon tool. Use the Polygon tool to draw polygons one side at a time.

Term	Definition
Polygon Overlay	A spatial operation that merges overlapping polygons from two layers to analyze those intersected areas or to create a third layer of new polygons.
Polyline, Polyline Object	A linetype object made up of many line segments. It contains more than two nodes, that is, more than its end points. The Polyline tool creates a single polyline. In contrast, the Line tool only draws a single straight line (that is, a line defined by two nodes).
Polyline Button	The Polyline button allows you to access the Polyline tool. Use the Polyline Tool to draw polylines (a connected sequence of lines that are not closed).
Projection	A mathematical model that transforms the locations of features on the earth's surface to locations on a two-dimensional surface, such as a paper map. Since a map is an attempt to represent a spherical object (the earth) on a flat surface, all projections have some degree of distortion. A map projection can preserve area, distance, shape or direction but only a globe can preserve all of these attributes. Some projections (for example, Mercator) produce maps well suited for navigation. Other projections (for example, equal-area projections, such as Lambert) produce maps well suited for visual analysis.
Query Table	A temporary table produced as the result of a Select, SQL Query, or by choosing objects in a Map window or records in a Browser and mapping, graphing, or browsing that selection. You cannot make edits and structural changes on query tables, but you can edit a selected set of rows in your source table through a query table. See **Selection on page 511** and **Base Table on page 498**.
Radius Select Button	The Radius Select button allows you to access the Radius Select tool. Use this tool to select all of the objects within a certain radius. See **Using the Radius Select Tool on page 306**.
Ranged Map	A type of thematic map that displays data according to ranges set by the user. The ranges are shaded using colors or patterns.
Raster Image	A type of computerized picture consisting of row after row of tiny dots (pixels). Raster images are sometimes known as bitmaps. Aerial photographs and satellite imagery are common types of raster data found in GIS. A computer image can be represented in raster format or in vector format. See **Scanning on page 510** and **Vector Image on page 514**.
Record	All the information about one object in a database or table. A record in a table corresponds to a row in a Browser.
Rectangle Button	The Rectangle button allows you to access the Rectangle tool. Use the Rectangle tool to draw rectangles and squares.
Redistricting	The process of assigning map objects to groups. As you assign map objects, MapInfo Professional automatically calculates totals for each group and displays the totals in a special Districts Browser. This process is sometimes known as load-balancing.

Term	Definition
Region, Region Object	An enclosed area defined by one or more polygons. If a region contains one or more lakes or islands, each lake or island is a separate polygon. A region is an object created with the Polygon tool.
Region Style Button	Use the Region Style button to access the Region Style dialog box. The Region Style dialog box allows you to specify the color, pattern, and borderline style of closed objects. You can also change the color and pattern of objects you are currently editing.
Registration	Usually the first stage of the digitizing process or when opening a raster image for the first time in MapInfo Professional. Before you can digitize a paper map or work with a raster image, you must point to several control points across the map, and enter their coordinates (for example, longitude, latitude). After you have registered the map, MapInfo Professional can associate a longitude, latitude position with any point on the map surface; this allows MapInfo Professional to perform area and distance calculations, and overlay multiple map layers in a single map. CAD systems as well as GIS systems utilize this process. See **Control Points on page 500**.
Reshape Button	The Reshape button toggles you in and out of Reshape mode. Use reshape to edit regions, polylines, lines, and points by moving, adding, and deleting nodes that define line segments. You can also copy and paste selected nodes to create new polylines. Reshape is very useful when you are creating sales territories or other merged boundaries. For example, you are merging ZIP Code boundaries to create school districts. Some ZIP Code boundaries fall into more than one school district. Use the Reshape button to reshape the school district to incorporate a section of the ZIP Code boundary. See **Reshaping Map Objects on page 293**.
Result Code	Result codes indicate whether a geocode match was made and the type of match it was, and conveys information about the quality of the match. The result code is an alphanumeric code of 1-10 characters.
Rounded Rectangle Button	The Rounded Rectangle button allows you to access the Rounded Rectangle tool. Use the Rounded Rectangle tool to draw rounded rectangles and squares.
Ruler Button	The Ruler button allows you to determine the distance between two points and the length of some path.
Run MapBasic Program Button	The Run MapBasic Program button accesses the Run MapBasic Application dialog box where you specify the MapBasic program you want to run.
Scale Bar	A map element that graphically depicts the map scale (for example, 0 —— 5 —— 10 km).
Scanning	The process of inputting data into a raster format using an optical device called a scanner.
Scroll Bar	Bars along the right and bottom sides of each window that allow you to scroll the window view. Clicking on the shaded area moves one window screen at a time.

Term	Definition
Select Button	The Select button allows you to access the Select tool. Use the Select tool to select one or more objects or records for analysis. You can also use the Select tool to edit a map, layout or browser. See **Selecting a Single Object from a Map or Layout on page 305**.
Selection	A data item or set of data items chosen for inspection and/or analysis. Regardless of the kinds of windows on the screen, selections can be made using the Select and SQL Select Query commands in MapInfo Professional's **Query** menu. In Browsers and Map windows, items can be placed in the selection set by clicking on them individually. Map windows also have special tools for selecting multiple items on a spatial basis.
Set Target District from Map Button	Use this button to make the selected object's district the new target district. See **Redistricting on page 509**.
Show MapBasic Window Button	The MapBasic window button allows you to display or hide the MapBasic window. You can perform many different tasks by typing commands into the MapBasic window. Choosing items from MapInfo Professional's menus could instead perform those same tasks. There are times, however, when it is easier to type commands into the command window.
Snap To Nodes	A feature that helps in drawing, moving and positioning map objects. In Snap mode (**S** key) the cursor snaps to a node of a map object when it comes within a certain distance.
Source Table	A permanent table, as opposed to a query table, which is temporary. You can edit the contents of source tables and you can change their structure (by editing, deleting, reordering columns and adding or deleting graphic objects).You cannot make edits and structural changes on query tables but you can edit a selected set of rows in your source table through a query table.
Spatial Analysis	An operation that examines data with the intent to extract or create new data that fulfills some required condition or conditions. It includes such GIS functions as polygon overlay or buffer generation and the concepts of contains, intersects, within or adjacent.
Spherical Coordinates	Latitude and longitude values that represent objects on the surface of the globe.
SQL (Structured Query Language)	A standard language used for analyzing information stored in relational databases. MapInfo Professional's database engine is based on the SQL standard.
SQL Query	The selection of information from a database according to the textual attributes and object relationships of the items. In MapInfo Professional, queries are created with the *SQL Select* and *Select* commands or with MapBasic commands in the MapBasic window.
Standard Deviation	A measurement of the variation of a set of data values around the mean.

Term	Definition
Standard Toolbar	A window containing buttons for quick access to the most commonly used menu commands such as Cut, Copy, and Paste.
Statistics Button	Use the Statistics button to display the Statistics window. The Statistics window tallies the sum and average of all numeric fields for the currently chosen objects/records. The number of records chosen is also displayed. As the selection changes, the data is re-tallied, and the statistics window is updated automatically. See **Redistricting on page 509**
Statistics Window	A window containing the sum and average of all numeric fields for the currently selected objects/records. The number of records selected is also displayed. As the selection changes, the data is re-tallied, and the statistics window updates automatically.
StatusBar	A bar at the bottom of the screen that displays messages that help in using MapInfo Professional. The StatusBar also displays messages that pertain to the active window. In a Map window, the StatusBar indicates what layer is editable, the zoom display of the map, and the status of Snap and Digitizing modes. In a Browser window, the StatusBar indicates the number of records currently displaying and the total number of records. In a Layout window, the StatusBar indicates the zoom display as a percentage of the actual size of the map.
Structured Query Language (SQL)	A standard language used for analyzing information stored in relational databases. MapInfo Professional's database engine is based on the SQL standard.
Subselect	A select statement that is placed inside the Where Condition field of the SQL Select dialog box. MapInfo Professional first evaluates the subselect and then uses the results of the subselect to evaluate the main SQL Select statement.
Symbol, Symbol Object	A small, relatively simple shape (for example, square, circle, star, push-pin) used to graphically represent a point object (for example, a customer location).
Symbol Button	The Symbol button allows you to access the Symbol tool. Use the Symbol tool to place point symbols (push pins) on your map
Symbol Style Button	Use the Symbol Style button to access the Symbol Style dialog box. The Symbol Style dialog box allows you to display symbols and specify attributes for symbols. The attributes you can specify are size, color, and symbol type. You can change the attributes of existing symbols and specify attributes for new point objects before you create them. The point objects must reside, or be created in an editable layer. See **Symbol, Symbol Object**.
Table	A table is made up of data in rows and columns. Each row contains information about a particular geographic feature, event, etc. Each column contains a particular kind of information about the items in the table. You can display tables with graphic information stored in them as maps. See **Base Table on page 498** and **Query Table on page 509**. See also **Layer on page 504**.

Term	Definition
Table Row	In a table, a row contains all the information for a single item. It corresponds to a record in a table.
Target District	The district that is selected in a Districts Browser to be affected by subsequent redistricting operations.
Text Button	Use the Text Button to add titles, labels, and annotations to maps and Layouts. You can also use the Text Tool to rotate text with its edit handle.
Text Cursor	A blinking vertical bar that shows the position where text can be edited, inserted, or deleted.
Text Style Button	Use the Text Style button to access the Text Style dialog box. The Text Style dialog box allows you to choose a font and font settings for your text.
Thematic Layer	A layer containing the thematic settings for a map layer. Thematic layers are drawn directly over the map layer on which the thematic settings are based. They are also drawn in a particular order, depending on the number of thematic layers you have and the type of thematic map objects you are creating.
Thematic Map	A type of map that uses a variety of graphic styles (for example, colors or fill patterns) to graphically display information about the map's underlying data. Thus, a thematic map of sales territories might show one region in deep red (to indicate the region has a large number of customers), while showing another region in very pale red (to indicate the region has relatively few customers).
Thematic Shading	Map objects — points, lines, regions — that have been shaded, using a pattern and/or color, according to some point of information about the object, or theme (population, size, annual rainfall, date, and so forth).
Thematic Variable	The data values displayed on a thematic map. A thematic variable can be a field or expression.
Theme Legend	MapInfo Professional's original style legend that allows you to display legends for thematic maps and graphs. MapInfo Professional automatically creates a theme legend window for a thematic map. Customize its display through the Modify Thematic Map dialog box. See **Cartographic Legend on page 499**.
Toolbars	MapInfo Professional windows that contain a variety of buttons used to access tools and commands for mapping and drawing. There are four Toolbars: the Standard Toolbar provides tools for commonly performed tasks, the Main Toolbar provides primary tools (for example, Zoom-in, Select, Info, etc.) and the Drawing Toolbar contains all drawing tools. The Tools Toolbar contains the Run MapBasic Program and the Show/Hide MapBasic Window buttons. Toolbars may be reshaped and hidden.
Transformation	The process of converting coverage coordinates from one coordinate system to another through programmatic translation. The transformation of CAD generated Cartesian coordinates into earth coordinates is an example.

Term	Definition
Ungeocode	The process of removing X and Y coordinates from records in a table or database. Can also describe a table that has not been geocoded, such as an ungeocoded table.
Vector Image	A coordinate-based data structure commonly used to represent map features. Each object is represented as a list of sequential x,y coordinates. Attributes may be associated with the objects. A computer image can be represented in vector format or in raster format. See **Raster Image on page 509**.
Vertical Scroll Bar	The Vertical scroll bar appears at the right of the most windows. Use the vertical scroll bar to move up and down. The scroll box inside the scroll bar indicates your vertical location. You can use the mouse to scroll to other parts of the window.
Web Feature Services	A Web Feature Service (WFS) client retrieves geospatial GML (Geography Markup Language)2 data using HTTP GET and HTTP POST requests over the Internet or through a private intranet. The WFS client was developed in accordance with the 1.0.0 OpenGIS® Web Feature Service Implementation Specification, which is available online: **http://www.opengis.org/docs/02-058.pdf.**
Web Map Services	A Web Map Service (WMS) is a technology that gives you a source for data over your Intranet or over the Internet. This innovation is based on a specification from the Open GIS Consortium (OGC) and allows you to use raster map images from servers that also comply with the specification. An important element of this is that the WMS images are registered using the data's coordinate system so the WMS layer can be used with vector and other registered raster images. This specification supports transparent pixel definition for image formats as well. This allows you to use the images you retrieve as overlays and not solely as the bottom layer of your map. This is a very new technology and WMS may not exist for the geography you are looking for. Further, the WMS Server determines the data that is provided. See *Retrieving Map Data from Web Map Services i*n the *Help System*.
Web Service	A web service is a software system that is accessible using an intranet or Internet connection. Web services allow you to retrieve data that others are sharing internally or world-wide. The power of web services is that you can use them to create more powerful maps or in the case of geocoding or drive region services get more accurate and precise results using the same data.
Weighted Average	An average that gives more weight to one value over another when averaging. A method of averaging that uses a separate column of information to define the relative importance of each data value. The formula for a weighted average is: `SUM(DATA*WEIGHT)/SUM(WEIGHT)` where DATA is the column of data values and WEIGHT is the column of weights. If WEIGHT contains all 1's (or other non-zero values) this reduces to a simple average.
Window	In MapInfo Professional, Map windows, Browser windows, Graph windows and Layout windows are the major types of windows. They display the data stored in tables. The Toolbars, map legends, and the Info tool window are other types of windows.

Term	Definition
Workspace	A saved configuration of open MapInfo tables and windows.
Zoom-in Button	The Zoom-in button allows you to access the Zoom-in tool. Use the Zoom-in Tool to get a closer area view of a map or a layout. See **Zoom Layering**.
Zoom-out Button	The Zoom-out button allows you to access the Zoom-out tool. Use the Zoom-out tool to get a wider area view of a map or a layout. See **Zoom Layering**.
Zoom Layering	A setting that determines the range (for example, 0–3 miles, 2–5 miles, etc.) at which a layer is visible in a Map window.

B

Directory of MapInfo Professional Shortcuts

This Appendix contains a comprehensive list of the shortcuts available in the MapInfo Professional application. You can create custom shortcuts by editing the MAPINFOW.MNU file using a text editor.

CAUTION: **Making changes to the MAPINFOW.MNU file may cause the default shortcuts you change to stop working. Make these changes carefully and record your changes so you can change them back, if necessary.**

In this Appendix:

- Shortcuts for File Menu Items 518
- Shortcuts for Edit Menu Items 518
- Shortcut to Tools Menu Items 518
- Shortcuts to Objects Menu Items 519
- Shortcuts for Query Menu Items 519
- Shortcuts for Options Menu Items 519
- Shortcuts for Map Menu Items 520
- Shortcut for Layout Menu Item 520
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Shortcuts for File Menu Items

Menu Item	Keystrokes
File > New Table	**Ctrl+N**
File > Open	**Ctrl+O**
File > Save Table	**Ctrl+S**
File > Save Workspace	**Ctrl+K**
File > Print	**Ctrl+P**
File > Exit	**Alt+F4**

Shortcuts for Edit Menu Items

Menu Item	Keystrokes
Edit > Undo	**Ctrl+Z**
Edit > Cut	**Ctrl+X**
Edit > Copy	**Ctrl+C**
Edit > Paste	**Ctrl+V**
Edit > Clear	**Del**
Edit > Reshape	**Ctrl+R**
Edit > New Row	**Ctrl+E**
Edit > Get Info	**F7**

Shortcut to Tools Menu Items

Menu Item	Keystrokes
Tools > Run MapBasic Prog	**Ctrl+U**

Shortcuts to Objects Menu Items

Menu Item	Keystrokes
Objects > Set Target	**Ctrl+T**
Objects > Clear Target	**Ctrl+Delete**

Shortcuts for Query Menu Items

Menu Item	Keystrokes
Query > Unselect All	**Ctrl+W**
Query > Find	**Ctrl+F**
Query > Find Selection	**Ctrl+G**

Shortcuts for Options Menu Items

Menu Item	Keystrokes
Options > Line Style	**Shift+F8**
Options > Region Style	**Ctrl+F8**
Options > Symbol Style	**Alt+F8**
Options > Text Style	**F8**

Shortcuts for Map Menu Items

Menu Item	Keystrokes
Map > Layer Control	**Ctrl+L**
Map > Create Prism Map	**F10**
Map > Create 3D Map	**F11**
Map > Create Thematic Map	**F9**
Map > Modify Thematic Map	**Alt+F9**
Map > Previous View	**Alt+Left Arrow**

Shortcut for Layout Menu Item

Menu Item	Keystrokes
Layout > Previous View	Alt+Left Arrow

Shortcuts for Window Menu Items

Menu Item	Keystrokes
Window > New Browser	**F2**
Window > New Mapper	**F3**
Window > New Grapher	**F4**
Window > New Layout	**F5**
Window > Redraw Window	**Ctrl+D**
Window > Tile Windows	**Shift+F4**
Window > Cascade Windows	**Shift+F5**

Shortcuts by Keystroke

Menu Items	Keystrokes
Map > Previous View and Layout > Previous View	**Alt+Left Arrow**
File > Copy	**Ctrl+C**
Window > Redraw Window	**Ctrl+D**
File > New Row	**Ctrl+E**
Query > Find	**Ctrl+F**
Query > Find Selection	**Ctrl+G**
File > Save Workspace	**Ctrl+K**
Map > Layer Control	**Ctrl+L**
File > New Table	**Ctrl+N**
File > Open	**Ctrl+O**
File > Print	**Ctrl+P**
File > Reshape	**Ctrl+R**
File > Save Table	**Ctrl+S**
Objects > Set Target	**Ctrl+T**
Tools > Run MapBasic Program	**Ctrl+U**
File > Paste	**Ctrl+V**
Query > Unselect All	**Ctrl+W**
File > Cut	**Ctrl+X**
File > Undo	**Ctrl+Z**
Objects > Clear Target	**Ctrl+Delete**
Window > New Browser	**F2**
Window > New Mapper	**F3**
Window > New Grapher	**F4**
Window > New Layout	**F5**

Menu Items	Keystrokes
File > Get Info	**F7**
Options > Text Style	**F8**
Map > Create Thematic Map	**F9**
Map > Create Prism Map	**F10**
Map > Create 3D Map	**F11**
File > Exit	**Alt+F4**
Options > Symbol Style	**Alt+F8**
Map > Modify Thematic Map	**Alt+F9**
Options > Region Style	**Ctrl+F8**
Window > Tile Windows	**Shift+F4**
Window > Cascade Windows	**Shift+F5**
Options > Line Style	**Shift+F8**
Edit > Delete	**Del**

C

Elements of a Coordinate System

In this Appendix:

- Projections and Their Parameters 524
- Projection Datums 527
- For More Information on Projections 543

Projections and Their Parameters

The next table indicates the parameters applicable to each projection, which are listed in the order they appear in the relevant coordinate system lines in the MAPINFOW.PRJ file.

	Projection Type	Datum	Units	Origin, Longitude	Origin, Latitude	Standard Parallel 1	Standard Parallel 2	Azimuth	Scale Factor	False Easting	False Northing	Range
Albers Equal-Area Conic	9	X	X	X	X	X	X			X	X	
Azimuthal Equidistant	28	X	X	X	X *							X
Cassini-Soldner	30	X	X	X	X					X	X	
Cylindrical Equal Area	2	X	X	X		X						
Double Stereographic	14	X	X	X	X				X	X	X	
Eckert IV	15	X	X	X								
Eckert VI	6	X	X	X								
Equidistant Conic	17	X	X	X	X	X	X			X	X	
Gall	7	X	X	X								
Hotine Oblique Mercator	4	X	X	X	X			X	X	X	X	
Lambert Azimuthal Equal-Area	3	X	X	X	X †							X
Lambert Conformal Conic	1	X	X	X	X	X	X			X	X	
Longitude-Latitude	10	X										
Mercator	11	X	X	X								
Miller	13	X	X	X								
Mollweide	18	X	X	X								
New Zealand Map Grid	27	X	X	X	X					X	X	
Polyconic	31	X	X	X	X					X	X	
Regional Mercator	26	X	X	X		X						
Robinson	12	X	X	X								

	Projection Type	Datum	Units	Origin, Longitude	Origin, Latitude	Standard Parallel 1	Standard Parallel 2	Azimuth	Scale Factor	False Easting	False Northing	Range
Sinusoidal	16	X	X	X								
Stereographic	20	X	X	X	X				X	X	X	
Swiss Oblique Mercator	25	X	X	X	X					X	X	
Transverse Mercator	8	X	X	X	X				X	X	X	

* MapInfo supports the Azimuthal Equidistant and Lambert Azimuth Equal-Area projections in the polar aspect only. The Origin Latitude for these projections must be either 90 or -90.

† Versions of MapInfo prior to 6.0 support the Azimuthal Equidistant and Lambert Azimuthal Equal-Area projections in the polar aspect only. The Origin Latitude for these projections must be either 90 or -90. An Oblique Azimuthal Equidistant projection supports all Origin Latitudes, including the poles. A new Lambert Azimuthal Equal-Area projection has been added that also supports all Origin Latitudes, including the poles.

Projection Types

The projection type is the equation or equations used by a coordinate system. The following list names the projections MapInfo uses and gives the number used to identify the projection in the MAPINFOW.PRJ file:

Number	Projection Type
9	Albers Equal-Area Conic
28	Azimuthal Equidistant (all origin latitudes)
5	Azimuthal Equidistant (polar aspect only)
30	Cassini-Soldner
2	Cylindrical Equal-Area
31	Double Stereographic
14	Eckert IV
15	Eckert VI
6	Equidistant Conic, also known as Simple Conic

Number	Projection Type
17	Gall
7	Hotine Oblique Mercator
4	Lambert Azimuthal Equal-Area (polar aspect only)
29	Lambert Azimuthal Equal-Area
3	Lambert Conformal Conic
19	Lambert Conformal Conic (modified for Belgium 1972)
1	Longitude/Latitude
10	Mercator
11	Miller Cylindrical
13	Mollweide
18	New Zealand Map Grid
27	Polyconic
26	Regional Mercator
12	Robinson
16	Sinusoidal
20	Stereographic
25	Swiss Oblique Mercator
8	Transverse Mercator, (also known as Gauss-Kruger)
21	Transverse Mercator, (modified for Danish System 34 Jylland-Fyn)
22	Transverse Mercator, (modified for Danish System 34 Sjaelland)
23	Transverse Mercator, (modified for Danish System 34/45 Bornholm)
24	Transverse Mercator, (modified for Finnish KKJ)

Projection numbers in the MAPINFOW.PRJ may be modified by the addition of a constant value to the base number listed in the Projection table, above. Valid values and their meanings are in the next table:

Constant	Meaning	Parameters
1000	System has affine transformations	Affine units specifier and coefficients appear after the regular parameters for the system.
2000	System has explicit bounds	Bounds appear after the regular parameters for the system.
3000	System with both affine and bounds	Affine parameters follow system's parameters; bounds follow affine parameters.

Example:

Assume you want to work with a simple system based on the Transverse Mercator projection and using the NAD 1983 datum. You might have a line such as the following in your MAPINFOW.PRJ file:

"UTM Zone 1 (NAD 83)", 8, 74, 7, -177, 0, 0.9996, 500000, 0

Now let's say that you want a system based on this, but with an affine transformation specified by the following parameters (see *Affine Transformations* in the *Help System*: Units=meters; A=0.5; B=-0.866; C=0; D=0.866; E=0.5; and F=0. The required line in the MAPINFOW.PRJ file is:

"UTM Zone 1 (NAD 83) - rotated 60 degrees", 1008, 74, 7, -177, 0, 0.9996, 500000, 0, 7, 0.5, -0.866, 0, 0.866, 0.5, 0

Alternatively, if you want to bound the system to (x1, y1, x2, y2)=(-500000, 0, 500000, 1000000), the required line is:

"UTM Zone 1 (NAD 83) - bounded", 2008, 74, 7, -177, 0, 0.9996, 500000, 0, -500000, 0, 500000, 1000000

To customize the system using both of these modifications, the line is:

"UTM Zone 1 (NAD 83) - rotated and bounded", 3008, 74, 7, -177, 0, 0.9996, 500000, 0, 7, 0.5, -0.866, 0, 0.866, 0.5, 0, -500000, 0, 500000, 1000000

Projection Datums

The datum is established by tying a reference ellipsoid to a particular point on the earth. The following table lists these details for each datum. More specific datum information is available in *Basic and Custom Datums* in the *Help System*.

- The number used to identify the datum in the MAPINFOW.PRJ file.
- The datum's name
- The maps for which the datum is typically used
- The datum's reference ellipsoid

Number	Datum Name	Area of Coverage	Ellipsoid
1	Adindan	Ethiopia, Mali, Senegal, Sudan	Clarke 1880
2	Afgooye	Somalia	Krassovsky
1007	AGD 66, 7 parameter	Australia, A.C.T.	Australian National
1008	AGD 66, 7 parameter	Australia, Tasmania	Australian National
1009	AGD 66, 7 parameter	Australia, Victoria/NSW	Australian National
1006	AGD 84, 7 parameter	Australia	Australian National
3	Ain el Abd 1970	Bahrain Island	International
118	American Samoa	American Samoa Islands	Clarke 1866
4	Anna 1 Astro 1965	Cocos Islands	Australian National
119	Antigua Island Astro 1943	Antigua, Leeward Islands	Clarke 1880
5	Arc 1950	Botswana, Lesotho, Malawi, Swaziland, Zaire, Zambia, Zimbabwe	Clarke 1880
6	Arc 1960	Kenya, Tanzania	Clarke 1880
7	Ascension Island 1958	Ascension Island	International
9	Astro B4 Sorol Atoll	Tern Island	International
8	Astro Beacon “E”	Iwo Jima Island	International
10	Astro DOS 71/4	St. Helena Island	International
11	Astronomic Station 1952	Marcus Island	International
12	Australian Geodetic 1966 (AGD 66)	Australia and Tasmania Island	Australian National
13	Australian Geodetic 1984 (AGD 84)	Australia and Tasmania Island	Australian National
120	Ayabelle Lighthouse	Djibouti	Clarke 1880
1019	Belgian 1972 (7 parameters)	Belgium	International 1924
110	Belgium	Belgium	International
14	Bellevue (IGN)	Efate and Erromango Islands	International
15	Bermuda 1957	Bermuda Islands	Clarke 1866

Number	Datum Name	Area of Coverage	Ellipsoid
16	Bogota Observatory	Colombia	International
121	Bukit Rimpah	Bangka and Belitung Islands (Indonesia)	Bessel 1841
17	Campo Inchauspe	Argentina	International
18	Canton Astro 1966	Phoenix Islands	International
19	Cape	South Africa	Clarke 1880
20	Cape Canaveral	Florida and Bahama Islands	Clarke 1866
1005	Cape, 7 parameter	South Africa	WGS 84
21	Carthage	Tunisia	Clarke 1880
22	Chatham 1971	Chatham Island (New Zealand)	International
23	Chua Astro	Paraguay	International
122	Coordinate System 1937 of Estonia	Estonia	Bessel 1841
24	Corrego Alegre	Brazil	International
123	Dabola	Guinea	Clarke 1880
124	Deception Island	Deception Island, Antarctica	Clarke 1880
1000	Deutsches Hauptdreicksnetz (DHDN) Potsdam/Rauenberg	Germany	Bessel
25	Djakarta (Batavia)	Sumatra Island (Indonesia)	Bessel 1841
26	DOS 1968	Gizo Island (New Georgia Islands)	International
27	Easter Island 1967	Easter Island	International
115	EUREF 89	Europe	GRS 80
28	European 1950 (ED 50)	Austria, Belgium, Denmark, Finland, France, Germany, Gibraltar, Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland	International
29	European 1979 (ED 79)	Austria, Finland, Netherlands, Norway, Spain, Sweden, Switzerland	International
108	European 1987 (ED 87)	Europe	International

Number	Datum Name	Area of Coverage	Ellipsoid
125	Fort Thomas 1955	Nevis, St. Kitts, Leeward Islands	Clarke 1880
30	Gandajika Base	Republic of Maldives	International
116	GDA 94	Australia	GRS 80
32	Geodetic Reference System 1967 (GRS 67)	Worldwide	GRS 67
33	Geodetic Reference System 1980 (GRS 80)	Worldwide	GRS 80
126	Graciosa Base SW 1948	Faial, Graciosa, Pico, Sao Jorge, and Terceira Islands (Azores)	International 1924
34	Guam 1963	Guam Island	Clarke 1866
35	GUX 1 Astro	Guadalcanal Island	International
150	Hartbeesthoek 94	South Africa	WGS 84
127	Herat North	Afghanistan	International 1924
128	Hermannskogel	Yugoslavia (Prior to 1990), Slovenia, Croatia, Bosnia and Herzegovina, Serbia	Bessel 1841
36	Hito XVIII 1963	South Chile (near 53°S)	International
37	Hjorsey 1955	Iceland	International
38	Hong Kong 1963	Hong Kong	International
1004	Hungarian Datum of 1972 (HD 72)	Hungary	GRS 67
39	Hu-Tzu-Shan	Taiwan	International
40	Indian	Thailand and Vietnam	Everest (India 1830)
41	Indian	Bangladesh, India, Nepal	Everest (India 1830)
129	Indian	Pakistan	Everest (Pakistan)
130	Indian 1954	Thailand	Everest (India 1830)
131	Indian 1960	Vietnam	Everest (India 1830)
132	Indian 1975	Thailand	Everest (India 1830)
133	Indonesian 1974	Indonesia	Indonesian 1974

Number	Datum Name	Area of Coverage	Ellipsoid
42	Ireland 1965	Ireland	Modified Airy
134	ISTS 061 Astro 1968	South Georgia Island	International 1924
43	ISTS 073 Astro 1969	Diego Garcia	International
44	Johnston Island 1961	Johnston Island	International
45	Kandawala	Sri Lanka	Everest (India 1830)
46	Kerguelen Island	Kerguelen Island	International
47	Kertau 1948	West Malaysia and Singapore	Everest (W. Malaysia and Singapore 1948)
1016	KKJ	Finland	International
135	Kusaie Astro 1951	Caroline Islands, Federated States of Micronesia	International 1924
48	L.C. 5 Astro	Cayman Brac Island	Clarke 1866
136	Leigon	Ghana	Clarke 1880
49	Liberia 1964	Liberia	Clarke 1880
113	Lisboa (DLx)	Portugal	International
1018	Lithuanian Pulkovo 1942	Latvia, Lithuania	International 1924
50	Luzon	Philippines (excluding Mindanao Island)	Clarke 1866
51	Luzon	Mindanao Island	Clarke 1866
138	M'Poraloko	Gabon	Clarke 1880
52	Mahe 1971	Mahe Island	Clarke 1880
53	Marco Astro	Salvage Islands	International
54	Massawa	Eritrea (Ethiopia)	Bessel 1841
114	Melrica 1973 (D73)	Portugal	International
55	Merchich	Morocco	Clarke 1880
56	Midway Astro 1961	Midway Island	International
57	Minna	Nigeria	Clarke 1880

Number	Datum Name	Area of Coverage	Ellipsoid
137	Montserrat Island Astro 1958	Montserrat, Leeward Islands	Clarke 1880
58	Nahrwan	Masirah Island (Oman)	Clarke 1880
59	Nahrwan	United Arab Emirates	Clarke 1880
60	Nahrwan	Saudi Arabia	Clarke 1880
61	Naparima, BWI	Trinidad and Tobago	International
109	Netherlands	Netherlands	Bessel
1010	New Zealand Geodetic Datum 194, 7 parameter	New Zealand	International
31	New Zealand Geodetic Datum 1949 (NZGD 49)	New Zealand	International
62	North American 1927 (NAD 27)	Continental U.S.	Clarke 1866
63	North American 1927 (NAD 27)	Alaska	Clarke 1866
64	North American 1927 (NAD 27)	Bahamas (excluding San Salvador Island)	Clarke 1866
65	North American 1927 (NAD 27)	San Salvador Island	Clarke 1866
66	North American 1927 (NAD 27)	Canada (including Newfoundland Island)	Clarke 1866
67	North American 1927 (NAD 27)	Canal Zone	Clarke 1866
68	North American 1927 (NAD 27)	Caribbean (Turks and Caicos Islands)	Clarke 1866
69	North American 1927 (NAD 27)	Central America (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua)	Clarke 1866
70	North American 1927 (NAD 27)	Cuba	Clarke 1866
71	North American 1927 (NAD 27)	Greenland (Hayes Peninsula)	Clarke 1866
72	North American 1927 (NAD 27)	Mexico	Clarke 1866
73	North American 1927 (NAD 27)	Michigan (used only for State Plane Coordinate System 1927)	Modified Clarke 1866
74	North American 1983 (NAD 83)	Alaska, Canada, Central America, Continental U.S., Mexico	GRS 80

Number	Datum Name	Area of Coverage	Ellipsoid
139	North Sahara 1959	Algeria	Clarke 1880
107	Nouvelle Triangulation Francaise (NTF) Greenwich Prime Meridian	France	Modified Clarke 1880
1002	Nouvelle Triangulation Francaise (NTF) Paris Prime Meridian	France	Modified Clarke 1880
111	NWGL 10	Worldwide	WGS 72
117	NZGD 2000	New Zealand	GRS 80
140	Observatorio Meteorologico 1939	Corvo and Flores Islands (Azores)	International 1924
75	Observatorio 1966	Corvo and Flores Islands (Azores)	International
76	Old Egyptian	Egypt	Helmert 1906
77	Old Hawaiian	Hawaii	Clarke 1866
78	Oman	Oman	Clarke 1880
79	Ordnance Survey of Great Britain 1936	England, Isle of Man, Scotland, Shetland Islands, Wales	Airy
80	Pico de las Nieves	Canary Islands	International
81	Pitcairn Astro 1967	Pitcairn Island	International
141	Point 58	Burkina Faso and Niger	Clarke 1880
142	Pointe Noire 1948	Congo	Clarke 1880
143	Porto Santo 1936	Porto Santo and Madeiras Islands	International 1924
1000	Potsdam	Germany	Bessel
82	Provisional South American 1956	Bolivia, Chile, Colombia, Ecuador, Guyana, Peru, Venezuela	International
xxx	Provisional South Chilean 1963	South Chile (near 53°S)	International
83	Puerto Rico	Puerto Rico and Virgin Islands	Clarke 1866
1001	Pulkovo 1942	Germany	Krassovsky
84	Qatar National	Qatar	International
85	Qornoq	South Greenland	International

Number	Datum Name	Area of Coverage	Ellipsoid
1000	Rauenberg	Germany	Bessel
86	Reunion	Mascarene Island	International
112	Rikets Triangulering 1990 (RT 90)	Sweden	Bessel
1011	Rikets Triangulering 1990 (RT 90), 7 parameter	Sweden	Bessel
87	Rome 1940	Sardinia Island	International
1012	Russia PZ90	Russia	PZ90
1012	Russia PZ90	Russia	PZ90
1013	Russia SK42	Russia	SK95
1014	Russia SK95	Russia	PZ90
88	Santo (DOS)	Espirito Santo Island	International
89	São Braz	São Miguel, Santa Maria Islands (Azores)	International
90	Sapper Hill 1943	East Falkland Island	International
91	Schwarzeck	Namibia	Modified Bessel 1841
144	Selvagem Grande 1938	Salvage Islands	International 1924
145	Sierra Leone 1960	Sierra Leone	Clarke 1880
146	S-JTSK	Czech Republic	Bessel 1841
92	South American 1969	Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Venezuela, Trinidad and Tobago	South American 1969
93	South Asia	Singapore	Modified Fischer 1960
94	Southeast Base	Porto Santo and Madeira Islands	International
95	Southwest Base	Faial, Graciosa, Pico, Sao Jorge, Terceira Islands (Azores)	International
1003	Switzerland (CH 1903)	Switzerland	Bessel

Number	Datum Name	Area of Coverage	Ellipsoid
147	Tananarive Observatory 1925	Madagascar	International 1924
96	Timbalai 1948	Brunei and East Malaysia (Sarawak and Sabah)	Everest (India 1830)
97	Tokyo	Japan, Korea, Okinawa	Bessel 1841
1015	Tokyo97	Japan	
98	Tristan Astro 1968	Tristan da Cunha	International
99	Viti Levu 1916	Viti Levu Island (Fiji Islands)	Clarke 1880
148	Voirol 1874	Tunisia/Algeria	Clarke 1880
149	Voirol 1960	Algeria	Clarke 1880
100	Wake-Eniwetok 1960	Marshall Islands	Hough
101	World Geodetic System 1960 (WGS 60)	Worldwide	WGS 60
102	World Geodetic System 1966 (WGS 66)	Worldwide	WGS 66
103	World Geodetic System 1972 (WGS 72)	Worldwide	WGS 72
104	World Geodetic System 1984 (WGS 84)	Worldwide	WGS 84
1017	Xian	China	1980
105	Yacare	Uruguay	International
106	Zanderij	Surinam	International

Units

The following table lists the available coordinate units and the number used to identify the unit in the MAPINFOW.PRJ file:

Number	Units
6	Centimeters
31	Chains
3	Feet (also called International Feet)[1]

Number	Units
2	Inches
1	Kilometers
30	Links
7	Meters
0	Miles
5	Millimeters
9	Nautical Miles[2]
32	Rods
8	US Survey Feet (used for 1927 State Plane)[3]
4	Yards

1 One International Foot equals exactly 30.48 cm.

2 One Nautical Mile equals exactly 1852 meters.

3 One US Survey Foot equals exactly 12/39.37 meters, or approximately 30.48006 cm.

Coordinate System Origin

The origin is the point specified in longitude and latitude from which all coordinates are referenced. It is chosen to optimize the accuracy of a particular coordinate system. As we move north from the origin, Y increases. X increases as we move east. These coordinate values are generally called northings and eastings.

For the Transverse Mercator projection the origin's longitude defines the central meridian. In constructing the Transverse Mercator projection a cylinder is positioned tangent to the earth. The central meridian is the line of tangency. The scale of the projected map is true along the central meridian.

In creating a Hotine Oblique Mercator projection it is necessary to specify a great circle that is not the equator nor a meridian. MapInfo Professional does this by specifying one point on the ellipsoid and an azimuth from that point. That point is the origin of the coordinate system.

Standard Parallels (Conic Projections)

In conic projections a cone is passed through the earth intersecting it along two parallels of latitude. These are the standard parallels. One is to the north and one is to the south of the projection zone. To use a single standard parallel specify that latitude twice. Both are expressed in degrees of latitude.

Oblique Azimuth (Hotine Oblique Mercator)

When specifying a great circle (Hotine Oblique Mercator) using a point and an azimuth (arc), the azimuth is called the Oblique Azimuth and is expressed in degrees.

Scale Factor (Transverse Mercator)

A scale factor is applied to cylindrical coordinates to average scale error over the central area of the map while reducing the error along the east and west boundaries. The scale factor has the effect of recessing the cylinder into the earth so that it has two lines of intersection. Scale is true along these lines of intersection.

You may see the scale factor expressed as a ratio, such as 1:25000. In this case it is generally called the scale reduction. The relationship between scale factor and scale reduction is:

scale factor = 1-scale reduction

In this case the scale factor would be 1-(1/25000) or 0.99996.

False Northings and False Eastings

Calculating coordinates is easier if negative numbers aren't involved. To eliminate this problem in calculating State Plane and Universal Transverse Mercator coordinates, it is common to add measurement offsets to the northings and eastings. These offsets are called False Northings and False Eastings. They are expressed in coordinate units, not degrees. (The coordinate units are specified by the Units parameter.)

Range (Azimuthal Projections)

The range specifies, in degrees, how much of the earth you are seeing. The range can be between 1 and 180. When you specify 90, you see a hemisphere. When you specify 180 you see the whole earth, though much of it is very distorted.

Polyconic Projection

The following description is copied from "Map Projections – A Working Manual", USGS Professional Paper 1395, by John P. Snyder.

The Polyconic projection, usually called the American Polyconic in Europe, achieved its name because the curvature of the circular arc for each parallel on the map is the same as it would be following the unrolling of a cone which had been wrapped around the globe tangent to the particular parallel of latitude, with the parallel traced onto the cone. Thus, there are many ("poly-") cones involved, rather than the single cone of each regular conic projection.

The Polyconic projection is neither equal-area nor conformal. Along the central meridian, however, it is both distortion free and true to scale. Each parallel is true to scale, but the meridians are lengthened by various amounts to cross each parallel at the correct position along the parallel, so that no parallel is standard in the sense of having conformality (or correct angles), except at the central meridian. Near the central meridian, distortion is extremely small.

This projection is not intended for mapping large areas. The conversion algorithms used break down when mapping wide longitude ranges. For example, WORLD.TAB, from the sample data shipped with MapInfo Professional, may exhibit anomalies if reprojected using Polyconic.

Coordinate System Enhancements by Version

This section describes the coordinate system enhancements by product version. The MAPINFOW.PRJ file has been updated to support these changes. The datum details of these systems have been added to the *Basic Datums* in the *Help System*.

Coordinate System Additions for MapInfo Professional 8.5

ETRS-based Coordinate Systems Added. We added the following ETRS-based projections to our PRJ file: Transverse Mercator Zone 26-39, Lambert Conformal Conic, and Azimuthal Equal Area.

Lithuanian and Latvian Coordinate Systems. We added the following Latvian Coordinate Systems to the PRJ file: LKS-92, and Longitude/Latitude (LKS-92). We added EPSG codes to the following Lithuanian Coordinate Systems: LKS-94, Baltija-92, Longitude / Latitude (LKS-94) and KS-1942 Zone 4. These are the coordinate system parameters:

"LKS-92 (EUREF89)", 8, 115, 7, 24, 0, 0.9996, 500000, 0

"LKS-94 (EUREF89)", 8, 115, 7, 24, 0, 0.9998, 500000, 0

"Baltija-92 (EUREF89)", 8, 115, 7, 24, 0, 0.9996, 500000, 0

"UTM Zone 34 (EUREF89)", 8, 115, 7, 21, 0, 0.9996, 500000, 0

"UTM Zone 35 (EUREF89)", 8, 115, 7, 27, 0, 0.9996, 500000, 0

"Longitude / Latitude (EUREF89)", 1, 115

"KS-1942 Zone 4 (Lithuanian Pulkovo 1942)", 8, 1018, 7, 21, 0, 1, 4500000, 0

"KS-1942 Zone 5 (Lithuanian Pulkovo 1942)", 8, 1018, 7, 27, 0, 1, 5500000, 0

"KS-1963 Zone 0 (Lithuanian Pulkovo 1942)", 8, 1018, 7, 21.95, 0, 1, 250000, -11057.63

"KS-1963 Zone 1 (Lithuanian Pulkovo 1942)", 8, 1018, 7, 24.95, 0, 1, 1250000, -11057.63

"KS-1963 Zone 2 (Lithuanian Pulkovo 1942)", 8, 1018, 7, 27.95, 0, 1, 2250000, -11057.63

"KS-1942 (3 Degree) Zone 7 (Lithuanian Pulkovo 1942)", 8, 1018, 7, 21, 0, 1, 7250000, 0

"KS-1942 (3 Degree) Zone 8 (Lithuanian Pulkovo 1942)", 8, 1018, 7, 24, 0, 1, 8250000, 0

"KS-1942 (3 Degree) Zone 9 (Lithuanian Pulkovo 1942)", 8, 1018, 7, 27, 0, 1, 9250000, 0

"KS-1942 Central Meridian 24 (Lithuanian Pulkovo 1942)", 8, 1018, 7, 24, 0, 1, 0, 0

"Vilnius (Lithuanian Pulkovo 1942)", 8, 1018, 7, 24, 0, 1, -53799.7, -6040600

"Kaunas (Lithuanian Pulkovo 1942)", 8, 1018, 7, 24, 0, 1, 17981.7, -6073803

"Longitude / Latitude (Lithuanian Pulkovo 1942)", 1, 1018

Coordinate System Additions for MapInfo Professional 8.0

Chinese Coordinate Systems. We added a new Xian 1980 ellipsoid # 53 and two new datums: Xian 1980 - #1017 and Beijing 1954 - #154. These are the coordinate system parameters:

"GK Zone 25 (Xian 1980)\p2349", 8, 1017, 7, 75, 0, 1, 25500000, 0

"GK Zone 26 (Xian 1980)\p2350", 8, 1017, 7, 78, 0, 1, 26500000, 0

"GK Zone 27 (Xian 1980)\p2351", 8, 1017, 7, 81, 0, 1, 27500000, 0

"GK Zone 28 (Xian 1980)\p2352", 8, 1017, 7, 84, 0, 1, 28500000, 0

"GK Zone 29 (Xian 1980)\p2353", 8, 1017, 7, 87, 0, 1, 29500000, 0

"GK Zone 30 (Xian 1980)\p2354", 8, 1017, 7, 90, 0, 1, 30500000, 0

"GK Zone 31 (Xian 1980)\p2355", 8, 1017, 7, 93, 0, 1, 31500000, 0

"GK Zone 32 (Xian 1980)\p2356", 8, 1017, 7, 96, 0, 1, 32500000, 0

"GK Zone 33 (Xian 1980)\p2357", 8, 1017, 7, 99, 0, 1, 33500000, 0

"GK Zone 34 (Xian 1980)\p2358", 8, 1017, 7, 102, 0, 1, 34500000, 0

"GK Zone 35 (Xian 1980)\p2359", 8, 1017, 7, 105, 0, 1, 35500000, 0

"GK Zone 36 (Xian 1980)\p2360", 8, 1017, 7, 108, 0, 1, 36500000, 0

"GK Zone 37 (Xian 1980)\p2361", 8, 1017, 7, 111, 0, 1, 37500000, 0

"GK Zone 38 (Xian 1980)\p2362", 8, 1017, 7, 114, 0, 1, 38500000, 0

"GK Zone 39 (Xian 1980)\p2363", 8, 1017, 7, 117, 0, 1, 39500000, 0

"GK Zone 40 (Xian 1980)\p2364", 8, 1017, 7, 120, 0, 1, 40500000, 0

"GK Zone 41 (Xian 1980)\p2365", 8, 1017, 7, 123, 0, 1, 41500000, 0

"GK Zone 42 (Xian 1980)\p2366", 8, 1017, 7, 126, 0, 1, 42500000, 0

"GK Zone 43 (Xian 1980)\p2367", 8, 1017, 7, 129, 0, 1, 43500000, 0

"GK Zone 44 (Xian 1980)\p2368", 8, 1017, 7, 132, 0, 1, 44500000, 0

"GK Zone 45 (Xian 1980)\p2369", 8, 1017, 7, 135, 0, 1, 45500000, 0

"--- China - Gauss-Kruger (Xian 1980 6-degree zone) ---"

"GK Zone 13 (Xian 1980)\p2327", 8, 1017, 7, 75, 0, 1, 13500000, 0

"GK Zone 14 (Xian 1980)\p2328", 8, 1017, 7, 81, 0, 1, 14500000, 0

"GK Zone 15 (Xian 1980)\p2329", 8, 1017, 7, 87, 0, 1, 15500000, 0

"GK Zone 16 (Xian 1980)\p2330", 8, 1017, 7, 93, 0, 1, 16500000, 0

"GK Zone 17 (Xian 1980)\p2331", 8, 1017, 7, 99, 0, 1, 17500000, 0

"GK Zone 18 (Xian 1980)\p2332", 8, 1017, 7, 105, 0, 1, 18500000, 0

"GK Zone 19 (Xian 1980)\p2333", 8, 1017, 7, 111, 0, 1, 19500000, 0

"GK Zone 20 (Xian 1980)\p2334", 8, 1017, 7, 117, 0, 1, 20500000, 0

```
    "GK Zone 21 (Xian 1980)\p2335", 8, 1017, 7, 123, 0, 1, 21500000, 0
    "GK Zone 22 (Xian 1980)\p2336", 8, 1017, 7, 129, 0, 1, 22500000, 0
    "GK Zone 23 (Xian 1980)\p2337", 8, 1017, 7, 135, 0, 1, 23500000, 0
"--- China - Gauss-Kruger (Beijing 1954 6-degree zone) ---"
    "Beijing 1954 zone 13\p21413", 8, 154, 7, 75, 0, 1, 13500000, 0
    "Beijing 1954 zone 14\p21414", 8, 154, 7, 81, 0, 1, 14500000, 0
    "Beijing 1954 zone 15\p21415", 8, 154, 7, 87, 0, 1, 15500000, 0
    "Beijing 1954 zone 16\p21416", 8, 154, 7, 93, 0, 1, 16500000, 0
    "Beijing 1954 zone 17\p21417", 8, 154, 7, 99, 0, 1, 17500000, 0
    "Beijing 1954 zone 18\p21418", 8, 154, 7, 105, 0, 1, 18500000, 0
    "Beijing 1954 zone 19\p21419", 8, 154, 7, 111, 0, 1, 19500000, 0
    "Beijing 1954 zone 20\p21420", 8, 154, 7, 117, 0, 1, 20500000, 0
    "Beijing 1954 zone 21\p21421", 8, 154, 7, 123, 0, 1, 21500000, 0
    "Beijing 1954 zone 22\p21422", 8, 154, 7, 129, 0, 1, 22500000, 0
    "Beijing 1954 zone 23\p21423", 8, 154, 7, 135, 0, 1, 23500000, 0
    "Beijing 1954 zone 13N\p21473", 8, 154, 7, 75, 0, 1, 500000, 0
    "Beijing 1954 zone 14N\p21474", 8, 154, 7, 81, 0, 1, 500000, 0
    "Beijing 1954 zone 15N\p21475", 8, 154, 7, 87, 0, 1, 500000, 0
    "Beijing 1954 zone 16N\p21476", 8, 154, 7, 93, 0, 1, 500000, 0
    "Beijing 1954 zone 17N\p21477", 8, 154, 7, 99, 0, 1, 500000, 0
    "Beijing 1954 zone 18N\p21478", 8, 154, 7, 105, 0, 1, 500000, 0
    "Beijing 1954 zone 19N\p21479", 8, 154, 7, 111, 0, 1, 500000, 0
    "Beijing 1954 zone 20N\p21480", 8, 154, 7, 117, 0, 1, 500000, 0
    "Beijing 1954 zone 21N\p21481", 8, 154, 7, 123, 0, 1, 500000, 0
    "Beijing 1954 zone 22N\p21482", 8, 154, 7, 129, 0, 1, 500000, 0
    "Beijing 1954 zone 23N\p21483", 8, 154, 7, 135, 0, 1, 500000, 0
"--- China - Gauss-Kruger (Beijing 1954 3-degree zone) ---"
    "Beijing 1954 - 3-degree GK zone 25\p2401", 8, 154, 7, 75, 0, 1, 25500000, 0
    "Beijing 1954 - 3-degree GK zone 26\p2402", 8, 154, 7, 78, 0, 1, 26500000, 0
    "Beijing 1954 - 3-degree GK zone 27\p2403", 8, 154, 7, 81, 0, 1, 27500000, 0
    "Beijing 1954 - 3-degree GK zone 28\p2404", 8, 154, 7, 84, 0, 1, 28500000, 0
    "Beijing 1954 - 3-degree GK zone 29\p2405", 8, 154, 7, 87, 0, 1, 29500000, 0
```

"Beijing 1954 - 3-degree GK zone 30\p2406", 8, 154, 7, 90, 0, 1, 30500000, 0

"Beijing 1954 - 3-degree GK zone 31\p2407", 8, 154, 7, 93, 0, 1, 31500000, 0

"Beijing 1954 - 3-degree GK zone 32\p2408", 8, 154, 7, 96, 0, 1, 32500000, 0

"Beijing 1954 - 3-degree GK zone 33\p2409", 8, 154, 7, 99, 0, 1, 33500000, 0

"Beijing 1954 - 3-degree GK zone 34\p2410", 8, 154, 7, 102, 0, 1, 34500000, 0

"Beijing 1954 - 3-degree GK zone 35\p2410", 8, 154, 7, 105, 0, 1, 35500000, 0

"Beijing 1954 - 3-degree GK zone 36\p2411", 8, 154, 7, 108, 0, 1, 36500000, 0

"Beijing 1954 - 3-degree GK zone 37\p2412", 8, 154, 7, 111, 0, 1, 37500000, 0

"Beijing 1954 - 3-degree GK zone 38\p2413", 8, 154, 7, 114, 0, 1, 38500000, 0

"Beijing 1954 - 3-degree GK zone 39\p2414", 8, 154, 7, 117, 0, 1, 39500000, 0

"Beijing 1954 - 3-degree GK zone 40\p2415", 8, 154, 7, 120, 0, 1, 40500000, 0

"Beijing 1954 - 3-degree GK zone 41\p2416", 8, 154, 7, 123, 0, 1, 41500000, 0

"Beijing 1954 - 3-degree GK zone 42\p2417", 8, 154, 7, 126, 0, 1, 42500000, 0

"Beijing 1954 - 3-degree GK zone 43\p2418", 8, 154, 7, 129, 0, 1, 43500000, 0

"Beijing 1954 - 3-degree GK zone 44\p2420", 8, 154, 7, 132, 0, 1, 44500000, 0

"Beijing 1954 - 3-degree GK zone 45\p2421", 8, 154, 7, 135, 0, 1, 45500000, 0

"Beijing 1954 - 3-degree GK CM 75E\p2422", 8, 154, 7, 75, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 78E\p2423", 8, 154, 7, 78, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 81E\p2424", 8, 154, 7, 81, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 84E\p2424", 8, 154, 7, 84, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 87E\p2425", 8, 154, 7, 87, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 90E\p2426", 8, 154, 7, 90, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 93E\p2428", 8, 154, 7, 93, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 96E\p2429", 8, 154, 7, 96, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 99E\p2430", 8, 154, 7, 99, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 102E\p2431", 8, 154, 7, 102, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 105E\p2432", 8, 154, 7, 105, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 108E\p2433", 8, 154, 7, 108, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 111E\p2434", 8, 154, 7, 111, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 114E\p2435", 8, 154, 7, 114, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 117E\p2436", 8, 154, 7, 117, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 120E\p2437", 8, 154, 7, 120, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 123E\p2438", 8, 154, 7, 123, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 126E\p2439", 8, 154, 7, 126, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 129E\p2440", 8, 154, 7, 129, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 132E\p2441", 8, 154, 7, 132, 0, 1, 500000, 0

"Beijing 1954 - 3-degree GK CM 135E\p2442", 8, 154, 7, 135, 0, 1, 500000, 0

Guernsey Grid Coordinate System. We added a new transverse mercator coordinate system called the Guernsey Grid to the .PRJ file. This coordinate system is comprised of these 8 parameters: 8, 104 , 7, -2.416667, 49.500000, 0.999997, 47000, 50000

Hellenic Geodetic Reference System. We added a new datum called the Hellenic Geodetic Reference System # 153. This coordinate system is comprised of these 8 parameters: 8, 153, 7, 24, 0, 0.9996, 500000, 0

Baltic Projections (Lithuanian and Latvian). We added a new datum called the Lithuanian Pulkovo 1942 # 1018.

New Zealand Geodetic Datum 2000. We added 28 new meridional circuits in terms of NZGD2000 on Transverse Mercator projections.

"New Zealand Transverse Mercator (NZGD2000)\p2193", 8, 117, 7, 173, 0, 0.9996, 1600000, 10000000

"Amuri Circuit 2000\p2119", 8, 117, 7, 173.010000000, -42.688888889, 1, 400000, 800000

"Bay of Plenty Circuit 2000\p2106", 8, 117, 7, 176.466111111, -37.761111111, 1, 400000, 800000

"Bluff Circuit 2000\p2132", 8, 117, 7, 168.342777778, -46.600000000, 1, 400000, 800000

"Buller Circuit 2000\p2117", 8, 117, 7, 171.581111111, -41.810555556, 1, 400000, 800000

"Collingwood Circuit 2000\p2114", 8, 117, 7, 172.671944444, -40.714722222, 1, 400000, 800000

"Gawler Circuit 2000\p2125", 8, 117, 7, 171.360555556, -43.748611111, 1, 400000, 800000

"Grey Circuit 2000\p2118", 8, 117, 7, 171.549722222, -42.333611111, 1, 400000, 800000

"Hawkes Bay Circuit 2000\p2108", 8, 117, 7, 176.673611111, -39.650833333, 1, 400000, 800000

"Hokitika Circuit 2000\p2121", 8, 117, 7, 170.979722222, -42.886111111, 1, 400000, 800000

"Jacksons Bay Circuit 2000\p2123", 8, 117, 7, 168.60611111, -43.977777778, 1, 400000, 800000

"Karamea Circuit 2000\p2116", 8, 117, 7, 172.108888889, -41.289722222, 1, 400000, 800000

"Lindis Peak Circuit 2000\p2127", 8, 117, 7, 169.467500000, -44.735000000, 1, 400000, 800000

"Marlborough Circuit 2000\p2120", 8, 117, 7, 173.801944444, -41.544444444, 1, 400000, 800000

"Mt. Eden Circuit 2000\p2105", 8, 117, 7, 174.764166667, -36.879722222, 0.9999, 400000, 800000

"Mt. Nicholas Circuit 2000\p2128", 8, 117, 7, 168.39861111, -45.132777778, 1, 400000, 800000

"Mt. Pleasant Circuit 2000\p2124", 8, 117, 7, 172.726944444, -43.590555556, 1, 400000, 800000

"Mt. York Circuit 2000\p2129", 8, 117, 7, 167.738611111, -45.563611111, 1, 400000, 800000

"Nelson Circuit 2000\p2115", 8, 117, 7, 173.299166667, -41.274444444, 1, 400000, 800000

"North Taieri Circuit 2000\p2131", 8, 117, 7, 170.282500000, -45.861388889, 0.99996, 400000, 800000

"Observation Pt. Circuit 2000\p2130", 8, 117, 7, 170.628333333, -45.816111111, 1, 400000, 800000

"Okarito Circuit 2000\p2122", 8, 117, 7, 170.260833333, -43.110000000, 1, 400000, 800000

"Poverty Bay Circuit 2000\p2107", 8, 117, 7, 177.885555556, -38.624444444, 1, 400000, 800000

"Taranaki Circuit 2000\p2109", 8, 117, 7, 174.227777778, -39.135555556, 1, 400000, 800000

"Timaru Circuit 2000\p2126", 8, 117, 7, 171.057222222, -44.401944444, 1, 400000, 800000

"Tuhirangi Circuit 2000\p2110", 8, 117, 7, 175.640000000, -39.512222222, 1, 400000, 800000

"Wairarapa Circuit 2000\p2112", 8, 117, 7, 175.647222222, -40.92527778, 1, 400000, 800000

"Wanganui Circuit 2000\p2111", 8, 117, 7, 175.488055556, -40.241944444, 1, 400000, 800000

"Wellington Circuit 2000\p2113", 8, 117, 7, 174.776388889, -41.301111111, 1, 400000, 800000

Belgian Coordinate System. We have added a new 7-parameter datum called the Belgian National System 1972 # 1019. There are 7 parameters: 3, 1019, 7, 4.3674866667, 90, 49.8333339000, 51.1666672333, 150000.013, 5400088.438

British National Grid Coordinate System. We have added a second British National Grid coordinate system that has tighter bounds than the original. The new coordinate system is called British National Grid (1 mm accuracy) and are comprised of these 7 parameters: 2008, 79, 7, -2, 49, 0.9996012717, 400000, -100000, 0, 0, 2000000, 2000000

For More Information on Projections

The first three publications listed are relatively short pamphlets. The last two are substantial books. We've also given addresses and phone numbers for the American Congress of Surveying and Mapping (the pamphlets) and the U.S. Geological Survey (the books).

American Cartographic Association. *Choosing a World Map—Attributes, Distortions, Classes, Aspects*. Falls Church, VA: American Congress on Surveying and Mapping. Special Publication No. 2. 1988.

American Cartographic Association. *Matching the Map Projection the Need*. Falls Church, VA: American Congress on Surveying and Mapping. Special Publication No. 3. 1991.

American Cartographic Association. *Which Map is Best? Projections for World Maps*. Falls Church, VA: American Congress on Surveying and Mapping. Special Publication No. 1. 1986.

John P. Snyder. *Map Projections—A Working Manual.* Washington: U.S. Geological Survey Professional Paper 1395. 1987

John P. Snyder and Philip M. Voxland. *An Album of Map Projections*. Washington: U.S. Geological Survey Professional Paper 1453. 1989.

Contact Information

The Department of Geography at the University of Colorado at Boulder has made available "The Geographer's Craft" project, a website devoted to explanations of map projections, geodetic datums, and coordinate systems. It is particularly valuable because many of the explanations were presented using MapInfo Professional.

The materials may be used for study, research, and education. If you link to or cite the materials below, please credit the author: Peter H. Dana, The Geographer's Craft Project, Department of Geography, The University of Colorado at Boulder.

For geodetic datum information and explanations, go to:

http://www.colorado.edu/geography/gcraft/notes/datum/datum.html

For information on coordinate systems and associated topics, go to:

http://www.colorado.edu/geography/gcraft/notes/coordsys/coordsys.html

For information on map projections, go to:

http://www.colorado.edu/geography/gcraft/notes/mapproj/mapproj.html

D

Introductory Data Copyrights

In this Appendix:

- Understanding your Introductory and Sample Data 546
- Asia 546
- Europe 547
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Understanding your Introductory and Sample Data

If you install the data from the data CD that is shipped with MapInfo Professional, you will notice that it has the following directory structure and data presentation. We use the term Introductory Data to describe the data you can use to geocode locally and to enhance the maps you create in every session. The Sample Data folder provides examples of other types of data that are available from MapInfo Corporation.

Africa

Source: MapInfo Corporation From National Imagery and Mapping Agency (NIMA)

Data: Country and Surrounding country boundaries

Source: http://data.geocomm.com (Free off the internet) All countries appended to one table and thinned for size purposes)

Asia

Australia

Source: Copyright and Intellectual Property in the attached data sets rests with one of the following: The Australian Government represented by the Australian Bureau of Statistics; The Government of New South Wales represented by The Land Information Centre. MapInfo Australia Pty Ltd and PSMA Australia Ltd.

Data: Locations of the state boundaries and capitals and over 4000 major and minor cities. Map of major rivers and major roads.

Local government area boundary for Manly.

Tasmania area boundaries, feature points and water boundaries.

Map of New South Wales.

Sydney feature points, rivers, suburbs, towns, census collection district and postcode boundaries, and customer database.

Component street table and grid surrounding for Sydney.

Streetworks samples

Source: MapInfo from Digital Chart of the World

Data: Generalized map of major highways

Source: SPOT Image Corporation © CNES 1995

Data: Raster map of Sydney

Source: MapInfo Corporation from National Imagery and Mapping Agency (NIMA)

Data: Country boundary

Source: Hervey Bay City Council, 2000

Data: Point Vernon and Hervey Bay, Australia

China

Source: MapInfo from Digital Chart of the World

Data: Over 5,000 major and minor cities and major highways.

Source: MapInfo Corporation from National Imagery and Mapping Agency (NIMA)

Data: Country and surrounding country boundaries.

Japan

Source: GisNET data licensed to MapInfo by GISdata Limited. © GDC Ltd 1993

Data: Water, highway, rivers, lakes and major railroads.

Source: MapInfo from Digital Chart of the World.

Data: 142 major and minor cities including all prefecture capitals.

Source: MapInfo Corporation from National Imagery and Mapping Agency (NIMA)

Data: Country boundary.

India

Source: Risk Management Solutions, Inc.

Data: State, country and district boundaries.

Source: MapInfo from Digital Chart of the World

Data: Major and minor cities and state capitals.

Europe

Austria, Belgium, Denmark, Deutschland, Espana, France, Italy, Netherlands, Norway, Portugal, Sweden, Switzerland, United Kingdom

Source: 2001 Tele Atlas B.V. 's-Hertogenbosch. All Rights Reserved.

Data: StreetPro Austria, Belgium, Denmark, Deutschland, Espana, France, Italy, Netherlands, Norway, Portugal, Sweden, and Switzerland.

Source: GisNET data licensed to MapInfo by GISdata Limited. © GDC Ltd 1993

Data: Water and highway/roadway maps.

Source: MapInfo Corporation from National Imagery and Mapping Agency (NIMA)

Data: Country Boundaries (Austria, Belgium, Denmark, Deutschland, Espana, France, Italy, Netherlands, Norway, Portugal, Sweden, Switzerland, Europe and United Kingdom.)

Great Britain

Source: 2001 Tele Atlas B.V. 's-Hertogenbosch. All Rights Reserved. This product includes mapping data licensed from Ordnance Survey (R). (c) Crown 2001. License number 100020348

Data: StreetPro Great Britain

North America

Canada

Source: Portions (c) 2004 GDT-Canada, Inc.

Data: (Prince Edward Island) Airports, Census subdivisions, Major Primary and Secondary Highways, Institutions, Large Areas land use, Parks, Road Buffers, Streets, Transportation points, Urban Agglomeration, Province, Railways, Utility lines and Water areas.

Source: MapInfo from Digital Chart of the World

Data: Over 3000 major and minor cities and generalized map of major highways.

Source: MapInfo Corporation

Data: Country and Province boundaries and surrounding water.

Mexico

Source: MapInfo Corporation

Data: Surrounding water and country boundary.

Source: MapInfo from the Bureau of Transportation Statistics

Data: State boundaries.

Source: MapInfo from Digital Chart of the World

Data: Generalized map of major highways and locations of all state capitals, major and minor cities.

United States, DC

Source: Tele Atlas (GDT, Inc.) Portions (c) 2004 Tele Atlas, Inc. (GDT, Inc.)

Data: Postal code boundaries.

Source: MapInfo Canada

Data: 2000 Demographic data Blockgroup.

Source: Tele Atlas (GDT, Inc.) Portions (c) 2004 Tele Atlas, Inc. (GDT, Inc.)

Data: StreetPro and 5 digit postal codes

Source: © MapInfo Corporation 2001. Aerial Photography used with permission of RSC Group, LLC 2001. All rights reserved.

Data: 5 mile by 5 mile area of 1m and 3m ground resolution raster images.

Source: MapInfo Corporation

Data: Shields in StreetPro. Listing of NPA/NXXs covered in DC. Competitive, Local Exchange Carriers (CLEC), Personal Communications Services (PCS) markets, cellular telephone service areas as defined by the FCC, Local Exchange Carriers (LEC), Local Access Transport Areas (LATAs), Competitive Local Exchange Carriers (CLEC), rate center locations and wire center serving boundaries, Point Of Presence (POP) locations for long distance telephone carriers. Area Codes. POPINFO and ObstacleInfo.

Point file showing wireless (Cellular, Paging, PCS and SMR) switch locations.

Records of hurricanes between 1988 - 1996

Gas, electric utilities and cable franchise areas.

StreetPro - component tables (updated to January 2007).

Wireless samples for Sprint, ATT, Bell Atlantic, PGNT_P, PGMT_P, Nextel and GTE.

Current hazardous waste notifiers, Superfund Cleanup and National Priority List sites as defined by the EPS.

United States

Source: 1997- 1998 Schlosser Geographic Systems, Inc. ©

Data: Orthophoto Image of Seattle Airport.

States.tab and USA.tab to include the Census 2000 data. Further, there is a point ZIP codes file (US_ZIPS.tab) to assist you with more accurate geocoding. This file contains the data from our popular ZipInfo product. Source: Tele Atlas, Inc. (GDT, Inc.)

Data: Postal code boundaries (updated to October 2005) and Postal code points (updated to April 2007).

Source: MapInfo Canada

Data: 1990 Demographics by states and counties.

Source: MapInfo Corporation

Data: Sample customer database in various database formats. State boundaries with the states of Alaska and Hawaii inset.

Source: MapInfo from Digital Chart of the World

Data: Location of the state capitals and the location of 8875 cities. Point elevation data in feet and meters.

Source: MapInfo from NOAA

Data: Annual temperature and rainfall.

Source: MapInfo from the Bureau of Transportation Statistics

Data: A very generalized version of the Roadnet interstate data

Source: MapInfo from the US Census Bureau

Data: Updated County boundaries from Census 2000 including Puerto Rico. Map containing the location of 125 major cities and locations of 208,857 points of interest and landmarks.

Source: MapInfo from USGS

Data: MapInfo grid file of Washington DC – East and West

Source: Public Domain - OSU

Data: MapInfo grid file of Mt. St. Helens before and after eruption. MapInfo grid file of Crater Lake, Oregon

Source: Sure!MAPS ® RASTER © HTI 1995

Data: Raster image of Alaska, DC, Big Bend TX, Florida, Gulf Coast, Mid-Atlantic, Mississippi River, North Central, Northeastern US, Northern US Northwestern US, Rockies, Southwestern US.

Seamless raster of 50 US states.

World

Source: MapInfo Corporation

Data: Military Grid Reference System 84 NL to 80 SL, North & South Polar Regions. Grid of latitude and longitude at 15 degree increments.

Source: MapInfo from Digital Chart of the World

Data: Location of world capitals and point locations for major and minor cities.

Source: MapInfo Corporation from National Imagery and Mapping Agency (NIMA)

Data: World Boundaries.

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